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ABSTRACT

This student manual is part of the competency based education curriculum for students training in auto body repair. The manual contains learning modules in eight areas: (1) occupational information, (2) trim and accessories, (3) glass, (4) painting and refinishing, (5) metal work, (6) body alignment, (7) frame work, and (8) estimating. Within each module students are provided competency sheets (sixty-three job competencies in all) which contain a competency statement, performance objective, a list of learning activities with references, and a criterion evaluation. (LRA)

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Student Material

AUTO BODY REPAIR

Competency Based Education Curriculum

Prepared by

RCA Education Service

Produced at

the West Virginia

Vocational Curriculum Laboratory

by

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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PREFACE

It is with the greatest pleasure that we bring you another West Virginia competency based education (CBE) curriculum. This Auto Body Repair curriculum was developed for West Virginia by RCA Education Service. The effort was coordinated by staff of the Bureau of Vocational, Technical and Adult Education.

The Bureau began advocating CBE curriculum in 1974. Since that time West Virginia has produced over 20 CBE curricula in various occupational areas. We also have a number of CBE curricula currently in the process of being developed and/or field-tested.

This Auto Body Repair curriculum was disseminated to West Virginia educators at the Annual Vocational Teachers Conference held in Morgantown, West Virginia, in August 1979. Additional copies of this curriculum are available from:

Vocational Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

I trust this curriculum will help your program. Any suggestions you may have for improving it may be sent to our state Curriculum Lab. Through this feedback we plan to continually update our materials.

Clarence E Burdette

Clarence E. Burdette
Assistant State Superintendent of Schools
Bureau of Vocational, Technical and
Adult Education

COMPETENCY BASED CURRICULUM: AUTO BODY REPAIR

Program Organization

MODULE 01: OCCUPATIONAL INFORMATION

01 Describe working conditions common to auto body repairers.
02 Describe educational and/or technical requirements for auto body repairers.
03 Describe the job market over the next 5-10 years for auto body repairers.
04 Describe the average salary and benefits given to auto body repairers.
05 Describe or define basic tools and job tasks common to auto body repairers.

MODULE 02: TRIM AND ACCESSORIES

01 Remove and replace bumpers.
02 Replace molding.
03 Remove and replace grille.
04 Replace locks and latches.
05 Repair manual seat tracks.
06 Remove, replace, and adjust power window control units.
07 Repair and/or replace window raising and lowering mechanisms.
08 Remove and replace seat and shoulder belts.

MODULE 03: GLASS

01 Remove and install windshield or rear window.
02 Install and align windows in doors.
03 Seal leaks around windshield and rear window.

MODULE 04: PAINTING AND REFINISHING

01 Identify different types of abrasives and explain their functions.
02 Use and maintain a spray gun.
03 Clean and prepare surface for undercoats.
04 Mask sections and parts.
05 Prepare and apply undercoats.
06 Match and mix paint, using correct thinners according to shop conditions.
07 Paint and finish surface.
08 Heat dry painted surface.
09 Refinish automobile with acrylic enamel.
10 Refinish automobile with acrylic lacquer.
11 Apply pinstriping to automobile.
12 Replace woodgrain panels.

MODULE 05: METAL WORK

01 Identify the various types of construction used in automobile manufacturing.
02 Identify parts (body and frame) of an automobile.
03 Identify welding processes used in restoring a damaged automobile.
04 Set up oxyacetylene welding station.
05 Select tip pressure and flame for oxyacetylene welding.
06 Cut metal with a gas welder.
07 Perform gas butt welding.
08 Perform lap welding operations with a spot weld.
09 Weld automotive framing member with an arc welder.
10 Perform diagonal checking.
11 Identify sheet metal damage.
12 Use auto body hammers and dollies to "rough out" sheet metal.
13 Use body file and pick hammer to smooth damaged sheet metal.
14 Use slide hammer and body spoon to restore damaged sheet metal.
15 Shrink a stretched area on a panel.
16 Fill and smooth depressed areas with body solder.
17 Use light-duty hydraulic straightening equipment.
18 Use plastic filler to restore damaged area.
19 Use fiber glass to restore a damaged area.
20 Repair fiber glass bodies.

MODULE 06: BODY ALIGNMENT

01 Aligns moveable body components (doors, deck lid and hood).
02 Remove and install fenders.
03 Align headlights.
04 Align front end.
05 Remove and install fiber glass panel

MODULE 07: FRAME WORK

01 Analyze extent of damage to frame.
02 Align frame using portable or stationary frame equipment.
03 Repair frame horn and crossmember.
04 Reinforce frame.

MODULE 08: ESTIMATING

01 Explain why collision estimates may vary.
02 Identify extent of damages on automobile needing repair.
03 Use collision guide to compute costs of parts and labor for a damaged automobile.
04 Complete estimate form for a damaged automobile.
05 Verify insurance coverage.
06 Order parts and materials.

STUDENT COMPETENCY SHEET

MODULE 01: Occupational Information

Competency Statement 01: Describe working conditions common to auto body repairers

Performance Objective: You will describe the working conditions common to auto body repairers. You must use two references and list both the good and bad working conditions. You must receive a satisfactory rating on all items on the checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Get a copy of the most recent Occupational Outlook Handbook (OOH). (In the 1978-79 edition, Auto Body Repairers are discussed on page 407. If you have a different edition, you can look in the index for "Automobile Body Repairers.") Make notes on good and bad points about working as an Auto Body Repairer.
3. Ask your instructor for the name of a firm or individual to contact by telephone. Ask to speak to an auto body repairer. Make sure the person has time to talk to you and ask the following:
   - A. What are the advantages of the working conditions?
   - B. What are the disadvantages of the working conditions?
4. For a third reference, pick one of the following and collect information on working conditions.
   - A. Contact another auto body repairer.
   - B. See your counselor for additional material.
   - C. Go to the library to find a book or magazine article that deals with the subject.

   Now compare your information from the OOH, your telephone call, and your third reference.
5. When you feel you can complete the Performance Objective, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will report on the advantages and disadvantages of the working conditions for an auto body repairer. You may do it orally or in writing. You will be rated on the following checklist:

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Two sources cited.		
2. Disadvantages noted.		
3. Advantages noted.		
4. Reported clear and concisely.		

STUDENT COMPETENCY SHEET

MODULE 01: Occupational Information

Competency Statement 02: Describe the educational and/or technical requirements for auto body repairers

Performance Objective: You will describe the educational and/or technical requirements for an auto body repairer. You must use two references and receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Get a copy of the most recent Occupational Outlook Handbook (OOH). (In the 1978-1979 edition, Auto Body Repairers are discussed on page 407. If you have a different edition, you can look in the index for "Automobile Body Repairers.") Read the passage which discusses the education and/or technical requirements of an Auto Body Repairer. Answer the following questions:

   A. Could I get a job as an Auto Body Repairer without this training program?

   B. What opportunities will I have if I complete this training program?

   C. After I finish this training---what other sources of education could I use to receive more advanced training?

3. Ask your instructor for the name of a firm or an individual to contact by telephone. Ask to speak to an Auto Body Repairer. Make sure the person has the time to talk to you and ask the following:

   A. What training is necessary?

   B. Would additional training other than this program be helpful?

   C. What are the best sources of additional training?

Learning Activities Continued:

4. Select a third reference from the following list and collect information on the educational and/or technical requirements.

   A. Contact another Auto Body Repairer.

   B. See your instructor or counselor for additional information.

   C. Go to the library to find a book or magazine article that deals with the subject.

   Compare your information from your three sources. Make notes of any information that is contradictory. It might be necessary to check another source if the information is entirely different. When you feel you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will report on the educational and/or technical requirements for an Auto Body Repairer. You may complete the report orally or in writing. You must receive a satisfactory rating on each item in the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Two sources cited.	________	________
2. Report was clear and well organized.	________	________
3. Information did not contradict itself.	________	________

STUDENT COMPETENCY SHEET

MODULE 01: Occupational Information

Competency Statement 03:	Describe the job market over the next 5-10 years for Auto Body Repairers
Performance Objective:	You will describe the job market over the next 5-10 years for Auto Body Repairers. You must use two references and receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you are not able to do this, go on to Learning Activity #2.

2. Get a copy of the Occupational Outlook Handbook (OOH) published by the U.S. Department of Labor. Read the passage which describes the employment outlook for Auto Body Repairers. (In the 1978-79 edition this is found on page 408. If you are using a different edition, you can find this information by looking under the heading "Automobile Body Repairers" in the index).

3. Ask your instructor for the name of an individual to contact for information on the job market for Auto Body Repairers in your area. Ask the following questions:

   A. Is the auto repair field as a whole expanding or decreasing in this area?

   B. Is the need for trained Auto Body Repairers expanding or decreasing in this area?

   C. Will the advent of many new types of repair equipment or automobiles hinder my chances of gaining employment as an Auto Body Repairer?

4. Select a third reference from the following list and collect information on the job market.

   A. Obtain from your instructor the name of an auto body shop or an individual in an auto body shop to contact by telephone. Ask to speak to the Auto Body Repairer and ask the following questions:

      1) From your experience, is the need for Auto Body Repairers increasing or decreasing in our area?

Learning Activities Continued:

2) Will the advent of many new types of repair equipment or automobiles hinder my chances of gaining employment as an Auto Body Repairer?

B. See your instructor for additional or more recent job market information.

C. Go to the library and find a book or an article dealing with the subject.

Compare the information from your three sources. Make notes of any information which is contradictory. It might be necessary to check another source if information is entirely different. When you feel you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will make an oral or written report on the job market for Auto Body Repairers over the next 5 to 10 years. You must receive a satisfactory rating on each item in the Student Checklist below:

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Two sources cited.	______	______
2. Report made was clear, concise, and well organized.	______	______
3. Information was not contradictory.	______	______

STUDENT COMPETENCY SHEET

MODULE 01: Occupational Information

Competency Statement 04:	Describe the average salary and benefits given to Auto Body Repairers
Performance Objective:	You will describe the average salary and benefits given to Auto Body Repairers. You must use two references, and be able to identify the range of salaries and benefits for Auto Body Repairers in your area. You must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot do this, go on to Learning Activity #2.

2. Contact an employment agency by telephone, (These are listed under "Employment Agencies" in the Yellow Pages) and ask what the average starting salary for an Auto Body Repairer with formal training and no prior experience is in your area. Find out both the high and low range of the salary.

3. Ask your instructor for the name of an individual to contact at a large firm and a small firm in your area. Telephone the individual and make sure they have time to speak with you. Ask the following questions:

   A. What is the average starting salary of an Auto Body Repairer with formal training and no prior experience (unless you have experience as an Auto Body Repairer) with your firm?

   B. What are the benefits your firm provides its employees?

4. Select a third reference from the following list and collect information on the average salary and benefits of an Auto Body Repairer.

   A. Contact another large firm and another small firm and ask the questions listed above.

   B. Contact another employment agency.

   C. Go to the library and find a current magazine or newspaper article on the subject.

Learning Activities Continued:

5. Compare the information from your three sources. You must remember that the salaries that larger firms and small firms can offer will vary greatly and that there will be differences between firms in urban and rural areas. If your information is too contradictory, you may have to call many firms in your area so that you can have a general idea of the average figure. When you feel you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will make an oral or written report on the average salary and benefits of an Auto Body Repairer with formal training and your experience in your area. You must receive a satisfactory rating on each item in the evaluation.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Two sources cited.		
2. Salary and benefits listed for both large and small firms.		
3. Report was well organized, concise, and complete.		

STUDENT COMPETENCY SHEET

MODULE 01: Occupational Information

Competency Statement 05:	Describes or defines basic tools and job tasks common to Auto Body Repairers
Performance Objective:	You will describe or define the tools and job tasks common to Auto Body Repairers in a report to the class. You must receive a satisfactory rating on all items on a Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 14-17 in Auto Body Repairing and Repainting. List the groups of tools used by Auto Body Repairers and a brief description of the job they are used for. Be prepared to discuss your answers in a class discussion.

3. Read pages 58-67 in Auto Body Repairing and Repainting. List the two basic methods used for welding in an auto body shop, the equipment needed for each method, and three uses for welding in the shop. Be prepared to present a brief oral report if called on by your instructor.

4. Read pages 43-57 in Auto Body Repairing and Repainting. Describe the role of the power equipment operator in today's auto body shop and briefly describe three kinds of power equipment. Form small groups (3-5) and discuss your findings.

5. Read pages 136-144 in Auto Body Repairing and Repainting. Make a list of problems one could encounter as a glass installer. Be prepared to discuss your answers in a class discussion.

6. Read pages 202-212 in Auto Body Repairing and Repainting. List the skills you believe a good auto body painter would need. Be prepared to defend your list before the class. When you feel you can complete the Performance Objective, ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will report on the tools and job tasks common to Auto Body Repairers. You may do it orally or in writing. You will be rated on the following checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Tools were described.		
2. Job tasks were described.		
3. Report was clear, concise and well organized.		

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 01:	Remove and replace bumpers
Performance Objective:	Given a vehicle with impact absorbing bumper and helpers, you will remove, replace, and adjust the bumper without causing additional damage to the bumper and automobile. You may not use references and you must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Attend a lecture by your instructor on "Fixed and Impact Absorbing Bumpers." Take any notes necessary and participate in a class discussion on the following.

   a) Why are bumpers important?

   b) What are the disadvantages of fixed bumpers?

   c) What are the advantages of fixed bumpers?

   d) What materials are bumpers made of?

3. Read page 253, "Fixed Bumpers" in Total Auto Body Repair. Your instructor will tell you where to go to find a fixed bumper that has been taken apart. Use your book as a reference and study the bumper until you can identify each of the following parts and explain their function.

   a) Facebar (front and rear).

   b) Bumper bolts.

   c) Bumper guards.

   When you are ready, identify each part and explain their function to your instructor. When you complete this satisfactorily, go on to Learning Activity #4.

4. Read pages 257-260, "Impact Absorbing Bumpers," in Total Auto Body Repair. Your instructor will tell you where to go to find an impact absorbing bumper that has been taken apart. Use your book as a reference and study the bumper until you can identify the following parts and their function, and the difference between the fixed bumper and the impact absorbing bumper.

   a) Face bar.

   b) Back bar.

   c) Impact absorbers (round or square)

   When you are ready, identify each part and explain their function to your instructor. When you complete this satisfactorily, go on to Learning Activity #5.

5. Read pages 255-257, "Replacing Bumpers" in Total Auto Body Repair. With a student helper, practice removing a fixed bumper until you can remove the bumper without referring to the textbook. Have your instructor check your work. When you can remove a bumper satisfactorily, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on replacing a fixed bumper. Take any notes to make sure you know the proper procedure to perform the following.

   a) Transfer brackets and lights.

   b) Installing bumper guards.

   c) Connecting light wires.

   Practice the procedures until you can replace the bumper without using references. When you are ready, have your instructor watch you replace the bumper. When you can replace the bumper satisfactorily, go on to Learning Activity #7.

7. Attend a lecture/demonstration by your instructor on "Adjusting Bumpers." With a helper, practice adjusting the bumpers you replaced in Learning Activity #6 until you can adjust the bumper without using references. When you are ready, have the instructor check your work. When you complete this activity satisfactorily, go on to Learning Activity #8.

8. Read pages 260-261 in Total Auto Body Repair.

   a) List three precautions you must take when removing and replacing an impact-absorbing bumper

   b) Describe the procedure you should use when the absorbers are pushed back and bent. Check your answers with your instructor. When your work is satisfactory, go on to Learning Activity #9.

9. Attend a lecture/demonstration by your instructor on "Adjusting Impact-Absorbing Bumpers." Take notes to make sure you know the differences between adjusting fixed bumpers and impact-absorbing bumpers. Practice removing, replacing and adjusting impact-absorbing bumpers until you are ready for the Criterion Evaluation.

Criterion Evaluation:

You will be assigned to a vehicle which has impact-absorbing bumpers. You will remove, replace, and adjust the bumpers using helpers without causing any additional damage. You must receive a satisfactory rating on the Student Checklist below and you may not use references.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Removes bumper without causing damage to automobile.	________	________
2. Installs bumper guards correctly.	________	________
3. Installs bumper on frame correctly.	________	________
4. Adjusts bumpers so that the distances are equal all the way across and around the bumper.	________	________
5. Lights connected correctly.	________	________
6. Observes safety precautions.	________	________

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 02:	Replace molding
Performance Objective:	Given the name of a molding, you will locate the molding, remove and replace it without causing any damage to the molding or finish. The replacement must conform to the original appearance and function. You may use a service manual for reference.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Read pages 254-259 in Auto Body Repair, "Exterior Trim," and answer the questions for Unit 24 (1-7) on page 275. Check your answers during a class discussion. When you have answered all of the questions, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on the use and safety of an electric drill. Practice changing bits and drilling holes until your instructor is satisfied with your work. When you can operate an electric drill correctly and safely, go on to Learning Activity #4.

4. Study Figure 1-15 in The Principles of Auto Body Repairing and Repainting on page 20. Go to a vehicle and study the molding until you can identify each without using a reference. When you can identify each to your instructor, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on "Exterior Molding Attachments." Study the chart on page 255 in Auto Body Repair until you can identify the most common attachments and describe how to remove them. When you can identify them correctly, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on "Removing and Installing Exterior Molding." Take notes to make sure you know how to refer to the service manual and how to use masking tape and other precautions to avoid damaging the molding retainers and finish. After the demonstration, your instructor will assign you molding to practice removing and installing. Practice this until you are ready for the Criterion Evaluation.

Criterion Evaluation:

You will be assigned a section of an automobile to remove and install the molding, without causing damage to the molding or finish. You may use a service manual for a reference and the replacement must conform to the original appearance and function.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 03:	Remove and replace grille
Performance Objective:	Given a vehicle with grille damage, you will remove and replace the grille without causing additional damage and without using references. The replacement must conform to its original appearance.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.
2. Attend a lecture/demonstration by your instructor on removing and replacing grilles. Take notes and be prepared to answer the following questions during a class discussion following the lecture/demonstration.
    a) What metals are used in grilles?
    b) Grilles are usually attached by bolts to two different body parts. What are they?
    c) What tools are used in removing and replacing grilles?
    d) Is it necessary to straighten brackets or mountings?
    e) Describe how you would align a grille.
3. Go to a vehicle assigned to you by your instructor and practice removing and installing the grille. If you need help, see your instructor. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle with grille damage. You will remove and replace the grille without causing any additional damage to the automobile without using references. The replacement must conform to its original appearance.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 04:	Replace locks and latches
Performance Objective:	Given a vehicle requiring replacement of latch-lock mechanism, remove damaged or worn latch-lock mechanism and replace with a new placement part. Mechanism must be properly aligned and all trim and upholstery must be replaced without damage.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read chapter 17 in Auto Body Repairing and Repainting, pages 106-107, and answer the questions on page 116. Check your answers with your instructor. When you have answered the questions satisfactorily, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on "Disconnecting Actuating Arms and Removing the Latch-Lock Mechanism." Take any notes necessary and practice removing the latch-lock mechanism until you are ready for the instructor to review your work. When you can disconnect actuating arms and remove the latch-lock mechanism satisfactorily, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Installing a Latch-Lock Mechanism." Take any notes necessary and then practice installing the latch-lock mechanism until you can install it without using references. When you are ready, ask your instructor to review your work. When you complete the work satisfactorily, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on "Adjusting the Door Lock Striker and Making an Operational Check on the Mechanism." Take any notes necessary and practice adjusting the door lock striker and make operational checks on the mechanism. When you are ready, ask your instructor to check your work. When you complete the work satisfactorily, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle which requires the replacement of the latch-lock mechanism. You must remove and replace the lock without causing additional damage. The mechanism must be aligned and all trim and upholstery must be replaced without damage.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 05:	Repair manual seat tracks
Performance Objective:	Given a vehicle requiring manual seat repair, you will make necessary repairs or replacement, install seat and check for operation. The seat must operate smoothly and lock in all positions. You may not use references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Attend a lecture/demonstration by your instructor on the "Front Seat Attachment." Go to a vehicle assigned to you and identify the parts shown in Figure 20-14 on page 200 in Auto Body Repair. Study the diagram and the automobile until you can identify the parts without using references. When you review the parts with your instructor satisfactorily, go on to Learning Activity #3.

3. Read pages 199-200 in Auto Body Repair and practice removing the front seat until you can do so without using references. When you can remove the seat, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Inspecting and Repairing Manual Seat Tracks." Take any notes necessary. Your instructor will assign you several different parts of the seat to remove and replace. When you complete this work satisfactorily, go on to Learning Activity #5.

5. Attend a demonstration by your instructor on "Lubricating the Tracks and Operating Mechanism." Lubricate the seat you have been working on, taking care not to soil the seat or upholstery.

6. Install the seat in the reverse order in which you followed in Learning Activity #3. Practice installing the seat until you can install it without using references. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle requiring manual seat repair. You will remove the seat, make designated repairs, replace the seat and check for operation. The seat must operate smoothly and lock in all positions. You may not use references.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 06:	Remove, replace and adjust power window control units
Performance Objective:	Given a vehicle with defective power window control units, you will troubleshoot the problem and make the necessary repairs. The repaired window must raise and lower smoothly.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Read pages 295-296 in The Principles of Auto Body Repairing and Repainting. Answer the following questions.

   a) List the major sections of the wiring harness.

   b) Define "Leader."

   c) Trace the path of the feed harness.

   d) Describe the motor that operates power windows.

   e) Explain how you disconnect the window harness connector.

   f) Define the causes of open and short circuits.

   g) Describe the methods to check a switch that won't work.

   h) Describe how to check for open circuits.

   i) Describe how to check for a short circuit.

   Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #3.

3. Attend a lecture by your instructor on the "Power Window Circuit." As a reference, turn to page 298 in The Principles of Auto Body Repair. Take notes on how to identify and explain the function of the following.

   a) Switch terminal block.

   b) Feed.

   c) Circuit breaker.

   d) Master control switch.

   e) Ignition terminal.

   f) Fuse box.

Your instructor will quiz you on the above information. When you have passed the quiz, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Common Repairs on Power Motors." Take notes on the procedures to repair the following.

   a) Broken wires.

   b) Poor terminal contact.

   c) Poor ground.

   d) Resetting circuit breaker.

   e) Replacing relay.

   f) Replacing switch.

   g) Replacing motors.

   Your instructor will quiz you on the information. When you have passed the quiz, go on to Learning Activity #5.

5. Practice troubleshooting and repairing automobiles with power windows. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle with defective power window control units, and you will troubleshoot the problem and make the necessary repairs. The repaired window must raise and lower smoothly.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 07: Repair and/or replace window raising and lowering mechanisms

Performance Objective: Given a vehicle with damaged or broken window mechanism, you will repair and/or replace the mechanism. After repairs, the window must raise and lower smoothly. The window must be watertight against the weatherstrip on the pillar and roof rail.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Attend a lecture/demonstration by your instructor on "Front Door Hardware." Take notes that will help you identify each part and its function. Your instructor will assign you to an automobile. Go go the automobile and, using pages 214-215 in Auto Body Repair, study the different parts. When you feel you can identify each component, your instructor will quiz you on the information. When you pass the quiz, go on to Learning Activity #3.

3. Study Figure 11-7 on page 276 in The Principles of Auto Body Repair and Repainting. Describe in your own words how to correct the following.

   a) Front of window needs raised.

   b) Window is tilted in or out.

   c) Window outboard needs adjustments.

   Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on replacing the mounting plate and channels. Take any notes necessary. Practice repairing, adjusting or replacing the above parts on an automobile assigned to you. When you are ready, have the instructor check your work. If it is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle with damaged or broken window mechanism, and you will repair and/or replace the mechanism. After repairs, the window must raise and lower smoothly. The window must be watertight against the weatherstrip on the pillar and roof rail.

STUDENT COMPETENCY SHEET

MODULE 02: Trim and Accessories

Competency Statement 08:	Remove and replace seat and shoulder belts
Performance Objective:	Given a vehicle requiring seat belt and shoulder harness replacement, you will remove defective or worn belts and harness and replace them. Replacement belts must meet or exceed original installation.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If you cannot complete the Performance Objective, go on to Learning Activity #2.

2. Attend a lecture/demonstration by your instructor on "Removing and Installing Seat and Shoulder Belts." Take notes and make sure you know the proper procedures for:

   a) Inspecting the belts.

   b) Use of tools.

   c) Removing retainer bolts.

   d) Installation of replacement belt.

3. Practice removing and installing:

   a) Seat belts.

   b) Shoulder belts.

   c) Combination seat and shoulder belts.

   When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a vehicle requiring seat belt and shoulder harness replacement, and you will remove defective or worn belts and harness and replace them. Replacement belts must meet or exceed original installation.

STUDENT COMPETENCY SHEET

MODULE: 03 Glass

Competency Statement: 01 Remove and install windshield or rear window.

Performance Objective: Given a vehicle with broken windshield or rear window, you will remove the glass bound by rubber channels and glass bound caulking and adhesive, and install new glass. You will use the following equipment without damage to yourself or the vehicle: piano wire, wide blade screw driver, hot knife, checking blocks, and installation cord. You may use an assistant and the glass must be installed so there is 1/4" between the glass and pinch weld flang. The glass should not leak under water pressure.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read safety precautions on page 231 in Auto Body Repair. Participate in a class discussion on the proper safety procedures.

3. Read pages 204-207 "Removal of Glass in Rubber Channel" and "Installation" in Auto Body Repair. Answer the following questions:

   a. Which should you do first - Inspect the glass or place protective covers on the vehicle?

   b. Is it necessary to remove mirror, windshield wipers, sunvisors, etc. EVERY TIME you remove glass?

   c. Which do you do first - remove outside reveal moldings or remove the glass?

   d. Do you loosen the lip of the rubber channel from the pinch weld flange from the inside or outside of the vehicle?

   e. After the rubber channel is free, what do you do?

Learning Activities

f. What happens if the area where bonding and sealing is required is not cleaned properly?

g. Why are rubber checking blocks needed? Where do you place them?

h. What other method can you use to prevent chipping or breaking?

i. Why must the channel be clean before you put it on the glass?

j. Where do you place the pull cord?

k. Describe the steps of installation after the glass and rubber channel are positioned.

Check your answers with your instructor.

4. Read pages 136-144 in Auto Body Repairing and Repainting. Answer the questions in "Quiz - Chapter 20" on page 144. Check your answers with your instructor.

5. Attend a lecture/demonstration by your instructor on removing glass in a rubber channel. After the demonstration, practice removing and installing glass in a rubber channel. Remember to practice all safety precautions.

6. Attend a lecture/demonstration by your instructor on removing adhesive-caulked glass. Practice removing and installing adhesive-caulked glass. When you are ready, ask your instructor to give you the Criterion Evaluation.

Criteria Evaluation

You will be given a vehicle with a broken windshield or rear window. You will remove and replace the glass observing all safety procedures. You may use an assistant and the glass must be installed so there is 1/4" between the glass and pinch weld flange. The glass must not leak under water pressure.

STUDENT COMPETENCY SHEET

MODULE: 06 Glass

Competency Statement: 03 Install and align windows in doors.

Performance Objective: Given a vehicle that needs the window installed and/or adjusted. You will remove the door panel without damaging the vehicle and remove the broken glass, and install and adjust the new glass without damage to the vehicle or replacement glass. The glass must prevent wind noise, water leaks and rattles. You must observe all safety rules.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read Chapter 19 pages 129-135 in Auto Body Repairing and Repainting. Using the book as a reference, remove the inside door panel of a vehicle and study the hardware until you can identify the following parts without reference.
    a. Ventilator assembly
    b. Window regulator
    c. Ventilator division channel
    d. Door lock remote control
    e. Window down stop support
    f. Inner panel cam
    g. Door lock
    h. Lower sash channel cam
    i. Ventilator attaching screws
    j. Glass run channel
    k. Stabilizers
    l. Stop

Student Competency Sheet - Page 2

Learning Activities:

3. Read page 390-392 in Total Auto Body Repair and pages 219-220 in Auto Body Repair for a closer look at replacing glass when metal channels and through bolts are used. After you have read, practice removing both types of glass. Remember to observe all safety precautions. Have your instructor check your work.

4. Read pages 220-221 in Auto Body Repair on making adjustments to glass that has been installed. Go to the vehicle you are working on and practice adjusting the glass. When you are ready see your instructor for the Criterion Evaluation. If not, proceed with Learning Activity #5.

Alternate Activities:

5. Attend a lecture/demonstration by your instructor on replacing and aligning windows in doors. If you need further demonstration complete Learning Activity #6.

6. View a filmstrip on aligning and replacing door windows. Check with your instructor and practice installing a window in another vehicle.

Student Competency Sheet - Page 3

Criterion Evaluation:

You will be given a vehicle that needs the window installed and aligned. You must remove the door panel correctly, remove the glass and install new glass without injury to yourself and without damage to the glass or the vehicle. You must observe all safety rules. You may not use references.

STUDENT COMPETENCY SHEET

MODULE: 03 Glass

Competency Statement:	03	Seal leaks around windshield and rear windows.
Performance Objective:		Given a vehicle with a leaky seal around the windshield or rear window, locate the leaks by using the water test, light test, or paper test. You must find and repair all of the leaks so that the window does not leak under water pressure. You must observe all safety rules.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 225-226 in Auto Body Repairing and Repainting, and pages 177-182 in Total Auto Body Repair.
    a. Briefly describe the following ways to check for leaks: water test, light test and paper test.
    b. Describe the procedure used to correct the leak. Show your work to your instructor for review.
3. Go to a vehicle assigned by your instructor. Use each of the three tests to find the leaks in the windshield and rear window. When you have found all of the leaks, tell your instructor what you have found. Under your instructor's supervision, repair the leaks. When you feel you are ready, see your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a vehicle with leaks in the windshield and rear window. You will select one or more test to locate the leaks and repair the leaks without damaging the vehicle or yourself. You must receive a satisfactory rating on each item on the checklist below.

CRITERION EVALUATION CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Observes all shop safety procedures.	______	______
2. Uses leak tests to discover all leaks on windshield and rear window.	______	______
3. Selects and uses the correct hand toos properly.	______	______
4. Repairs leaks so that the window does not leak under water pressure.	______	______

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 01:	Identify different types of abrasives and explain their functions
Performance Objective:	Given ten different job descriptions, you will match the job with the disk or sandpaper needed with 80% accuracy without using references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read Unit 9, "Body Abrasives," in Total Auto Body Repair, pages 165-175. Answer the following questions:

   a) Define abrasive.

   b) When do you use grinding discs?

   c) When do you use sandpaper?

   d) When do you use cutting (rubbing compound)?

   d) Define grit.

   f) What is the difference between grinding discs and sandpaper discs?

   g) What is the advantage in buying only 9 in. grinding discs?

   h) List the types of natural and manufactured grits.

   i) List the four basic grades of grit.

   j) Describe open coat and closed coat discs and their function.

   k) What is the function of grinding discs?

   l) List the type of sandpaper that can be used either wet or dry. List the sandpaper that can only be used dry.

   m) Describe the most popular sandpaper grits and their function in auto body repair.

   n) Why is compound used?

Check your answers with your instructor. When you have answered all of the questions satisfactorily, go on to Learning Activity #3.

3. Inspect each of the automobiles in your shop which need painting or refinishing. For each car describe the abrasives that will be necessary. Check your work with your instructor. When you have completed your work satisfactorily, go on to Learning Activity #4.

4. Your instructor will display different types of sandpaper and grinding discs. Study each until you can identify the size and grit of each. When you are ready, your instructor will quiz you. When you have passed the quiz, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will match the following job descriptions with the proper abrasive with 80% accuracy without using references.

1. Removing paint, preparing metal for filler, grinding off welds or rust and rough-working plastic filler.
2. Preparing the surface of bare metal or primer surfacer.
3. Clean old finishes and rub out new lacquer paint.
4. Sandpaper used to rough smooth plastic.
5. Sandpaper used to finish fine metal and plastic.
6. Smoothing metal and plastic repairs and sanding old finishes.
7. Sandpaper used when a lubricant is needed.
8. Disk needed on a grinder that produces less than 4000 RPM.
9. Disk used when a smoother cut is needed.
10. Minerals needed for very hard surfaces.

A. 150 grit and 220 grit
B. Cutting compound
C. 40-80 grit paper
D. 9 in. disk
E. Grinding discs.
F. Dry sandpaper
G. Sandpaper
H. Wet sandpaper
I. 7 in disk
J. Natural
K. Closed coat

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 02:	Use and maintain a spray gun
Performance Objective:	Given a cardboard box and a spray gun, you will paint the outside of the box without using references. You must receive a satisfactory rating on each item of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 301-306 in Auto Body Repair, "Spray Gun." Study Figure 27-16 on page 301 until you can identify each of the 10 parts of the spray gun. When you are ready, your instructor will quiz you on the information. When you pass the quiz, go on to Learning Activity #3.

3. Read pages 306-309, "Operation," in Auto Body Repair and answer the following:

   a) How do you change the spray pattern from vertical to horizontal?

   b) What happens if the port is not clean?

   c) What happens if the siphon cup and vent port are not positioned correctly?

   d) When is the spray gun with a siphon cup useful? Why is it not useful for overall refinishing?

   d) When is the remote cup assembly valuable? Why?

   f) Why do you use a shorter fluid nozzel with a pressure pot?

   Check your answers during a class discussion. Correct any mistakes you may have made. When you have answered all of the questions satisfactorily, go on to Learning Activity #4.

4. Read pages 308-30, "Maintenance," in Auto Body Repair. Using the book as a reference, your instructor will demonstrate how to maintain and clean the spray gun. After the demonstration, practice cleaning a suction feed spray gun and a pressure feed spray gun. When you can clean both types of spray guns without using references, have the instructor observe you cleaning the guns. When your instructor is satisfied with your work, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on the influence of temperature, viscosity, reduction, and mixing. Take any notes necessary. Study your notes and when you are ready, explain to your instructor the influence of the temperature, viscosity, reduction, and mixing. When your instructor is satisfied with your explanation, go on to Learning Activity #6.

6. Read pages 312-318 in Auto Body Repair. Using water and a panel made of paper, practice adjusting both the material flow and pattern shape until the spray gun can be moved exactly parallel to the test panel at a distance of six to eight inches. Keep practicing until you can apply the water without sags or thin spots. Have your instructor check your work. When your instructor is satisfied, go on to Learning Activity #7.

7. Read pages 314-318 in Auto Body Repair. Then attend a lecture/demonstration by your instructor on the proper strokes to use while using a spray gun. Your instructor will demonstrate common mistakes and describe how to identify what is wrong with the painted surface. After the demonstration, pair off with another student and using water and paper practice spraying 3 foot square sections. Observe your partner and identify any problems or strokes that are not correct. When you can coat a 3-sq. ft. panel of paper without tilting or arcing the spray gun, and your instructor has checked your work, go on to Learning Activity #8.

8. Practice spraying a 3-sq. ft. panel of paper with paint until the surface is smooth, without any runs, or zebra effects. When your instructor is satisfied with your work, go on to Learning Activity #9.

9. Practice banding and cornering on a cardboard box with paint. When your instructor is satisfied with your work, ask for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation:

Given a cardboard box and a spray gun, you will paint the outside of the box by first banding, and then covering the box. You must receive a satisfactory rating on all items of the checklist below without using references.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Spray gun assembled correctly.	________	________
2. Spray gun held correctly.	________	________
3. Trigger used correctly.	________	________
4. Paints in alternate strokes.	________	________
5. 50% overlap.	________	________
6. Surface without sags, runs, dry spray, or zebra effects.	________	________
7. Banding performed correctly.	________	________
8. Cornering performed correctly.	________	________
9. Spray gun cleaned and stored properly.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 03:	Clean and prepare surface for undercoats
Performance Objective:	Given a sheet metal panel with paint damage, you will prepare the panel so it can be undercoated. You must receive a satisfactory rating on all items in the Student Checklist without using references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Wash the sheet metal panel with detergent and water. Clean the area with a pre-cleaning solvent to remove wax, grease, tar and polish. When you are finished, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on featheredging. Take any notes necessary so that you can mechanically featheredge and chemically featheredge. Featheredge your sheet panel at least 3/4 inch all around the damaged area.

4. Attend a lecture/demonstration by your instructor on preparing paint for refinishing by sanding and stripping. Take notes to make sure you know the following:

   a) What type of sandpaper is used to prepare the surface for lacquer? For enamel?

   b) What can happen to plastic filler underneath the finish when you use paint remover?

   c) When do you use sandpaper?

   d) When do you use paint remover?

   Check your answers with your instructor. Sand your sheet metal panel to prepare it for lacquer and use paint remover on the other half of the panel. Check your work with your instructor. If it is satisfactory, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on treating metal. Following the demonstration, treat your sheet metal panel. When your instructor checks your work and it is satisfactory, go on to Learning Activity #6.

6. Wash your sheet metal panel with enamel reducer to neutralize chemicals and remove any sanding dust or other dirt on the surface. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a sheet metal panel with paint damage. You will prepare the panel for undercoating. You must receive a satisfactory rating on all the steps in the Student Checklist without using references. You only have to perform the steps outlined in the checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Washes metal and applies pre-cleaning solvent correctly.	________	________
2. Featheredging smooth 3/4 in. all around damaged area.	________	________
3. Sands remaining area with correct sandpaper for lacquer paint.	________	________
4. Treats metal correctly.	________	________
5. Uses enamel reducer correctly.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 04: Mask sections and parts

Performance Objective: Given an automobile, you will mask the automobile to prepare for a complete paint job except for the hood. You must use reverse taping in at least one place. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 404-409 in Total Auto Body Repair, "Masking." Be prepared to answer the following in a class discussion.

   a) When can you remove masking tape after a paint job?

   b) Why is it not wise to use paper other than masking paper?

   c) What are the two "ground rules" for applying masking paper and tape? Why?

   d) Describe how to mask glass.

   e) Describe how to mask antennas and wiper blades.

   f) Describe how to mask lights.

   g) Describe how to mask door panels.

   h) Describe how to mask small trim and lettering. When is it wise to remove the pieces?

   i) When do you mask along "natural breaks"? Why?

   j) What is reverse taping? How and why is it done?

   When you have answered all of the questions satisfactorily, go on to Learning Activity #3.

3. Your instructor will assign you to a vehicle. Mask each of the following surfaces. After you finish each one, have your instructor check your work.

   a) windshield and rear glass

   b) side glass

   c) antenna and wiper blades

   d) all small trim and lettering

   e) front lights

   f) door jambs

   g) left rear quarter panel along natural breaks

   h) reverse tape hood and trunk lid

   When you have masked all of the surfaces satisfactorily, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be assigned an automobile to mask, and prepare for a complete paint job except for the hood. You must use reverse taping at least once. You must receive a satisfactory rating on all items of the Student Checklist without using references.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Correct width tape and paper selected.		
2. Tape and paper applied to clean and dry surface.		
3. Lacquer applied to weather-strip.		
4. Tape applied firmly and stretched tightly.		
5. Tape torn correctly.		
6. Pleats folded and taped.		
7. Masking applied along natural breaks.		
8. Use method of reverse taping correctly.		
9. Trim and lettering masked correctly.		

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 05:	Prepare and apply undercoats
Performance Objective:	Given a sheet metal panel that has been prepared, prepare and apply undercoats. You may only use manufacturer's directions as a reference and you must receive a satisfactory rating on all items of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 439-444, "Apply Primer Surface," in Total Auto Body Repair. Be prepared to answer the following questions during a class discussion.

   a) What is the difference between thinners and reducers?

   b) How much air pressure do you use for lacquer spot repairs? For large overall jobs?

   c) How much air pressure do you use for enamel spot repairs?

   d) Define "mid-temp." and "low-temp" reducers and thinners?

   e) What "temp" thinners do you use for lacquer?

   f) What "temp" reducers do you use for enamel?

   g) How many coats of primer-surfacer are necessary?

   h) Define "flash off."

   i) Should you apply paint putty before or after sanding the primer surface?

   j) Describe how to sand the primer surface.

   k) Describe how to use paint putty.

   l) Why do you only sand the area that will be covered by new paint?

   m) Why do you "compound" the good paint?

n) Why do you wash the entire area with enamel reducer?

o) Describe tacking.

p) Describe how to use sealers.

When you can answer all of the questions, go on to Learning Activity #3.

3. Get the sheet metal panel you prepared in Competency Statement 03, "Clean and Prepare Surface for Painting." If it is not available, your instructor will give you another panel. Prepare it for painting going through the steps in Student Competency 03 in this Module.

4. Explain to your instructor how you are going to mix your primer surfaces for your sheet metal panel. If your instructor approves, mix the thinner or reducer and apply six coats of the primer surfacer. After each coat, check your work with your instructor. When you have completed the work satisfactorily, go on to Learning Activity #5.

5. Block sand your panel. Check your work with your instructor. If any large nicks or chips appear, go on to Learning Activity #6. If they do not, your instructor will make some nicks or chips in your panel.

6. Apply paint putty to cover the nicks and chips. Attend a lecture/demonstration by your instructor on the final sanding. Take any notes and then block sand your panel. When you have sanded the area satisfactorily, go on to Learning Activity #7.

7. Compound 10" around the repair. Then wash the area with enamel reducer and dust and tack the area. Check your work with your instructor. If it is satisfactory, go on to Learning Activity #8.

8. Mix sealer according to manufacturer's directions. Check your mixture with your instructor. If it is mixed correctly, apply an even medium coat of sealer to the area. Allow the sealer to dry and lightly scuff the area and tack-wipe the area. Check your work with your instructor. If it is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a sheet metal panel prepared for painting. You must prepare and apply the undercoat. You may only use manufacturer's directions for references and you must receive a satisfactory rating on all items of the Student Checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Mixes correct primer-surfacer correctly.	______	______
2. Allows proper time between coats of primer-surfacer.	______	______
3. Primer-surfacer applied smoothly without sags, runs, or zebra effect.	______	______
4. Applies paint putty correctly.	______	______
5. Sands putty correctly.	______	______
6. Compounds area correctly.	______	______
7. Applies enamel reducer correctly.	______	______
8. Dusts and tacks area correctly.	______	______
9. Mixes sealer correctly.	______	______
10. Applies even medium coat of sealer to area.	______	______
11. Scuffs and tacks sealer properly.	______	______

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 06:	Match and mix paint, using correct thinners according to shop conditions.
Performance Objective:	Given a painted sheet metal panel, you will match and mix the paint according to shop conditions by using a reference chart and by using a spray gun. You must receive a satisfactory rating on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Attend a lecture/demonstration by your instructor, "Types of Paint." Take notes and prepare yourself for a quiz on the following:

    a) Identify and describe the three ingredients of paint.

    b) Describe lacquer paint and list its advantages and disadvantages.

    c) List the advantages and disadvantages of acrylic lacquers.

    d) Describe enamel paint and list its advantages and disadvantages.

    e) List the advantages and disadvantages of acrylic enamel.

    f) List the advantages and disadvantages of polyurethane enamel.

3. Read page 181-187 in Auto Body Repairing and Repainting and answer the questions on page 187. Check your answers with your instructor. When you have answered all of the questions correctly, go on to Learning Activity #4.

4. Locate the color identifying number on each automobile in your shop and find the name and number in a paint chip book. Check your work with your instructor. If it is satisfactory, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on the influence of shop conditions when mixing paints. Take notes and be prepared to discuss the following in a class discussion.

   a) What type of weather produces the fastest dry time? Why?

   b) What is considered normal dry time?

   c) What type of weather produces the slowest dry time of all?

   d) What type of thinner or reducer do you select for each type of weather?

   When you have answered the above correctly, practice mixing paint, using the correct thinner or reducer for the shop conditions. When you are ready, have your instructor check your work. If it is satisfactory, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on color matching. Take any notes necessary and practice matching colors by using paint chips and panels supplied by your instructor. Practice by using the method described on page 186 in Auto Body Repairing and Repainting and also by using the spray gun. Have your instructor check your work. When it is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Given a painted sheet metal panel, you will match the color and mix the paint according to shop conditions by 1) using a spray gun and 2) using a reference chart and color chips. You must receive a satisfactory rating on all items of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Selects correct reducer-thinner according to shop conditions.	________	________
2. Mixes correct amount of reducer-thinner according to shop conditions.	________	________
3. Uses spray gun to match color correctly.	________	________
4. Uses reference chart to match color.	________	________
5. Color matched as close as possible.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 07:	Paint and finish surface
Performance Objective:	Given two sheet metal panels that have all necessary undercoats, you will paint and finish the surface. You must finish one panel with lacquer and the other with enamel. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Mix your paint according to shop conditions and apply one coat. Wait for the paint to dry and apply a second coat. If the surface is not smooth, identify the problem by the pictures on page 208-210 in Auto Body Repairing and Repainting. When you have identified the problem, explain to your instructor the steps you will take to refinish the panel. If the surface is smooth, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on a "Mist Coat." Take notes and practice applying a mist coat to your lacquer panel. When you are ready, check your work with your instructor. If it is satisfactory, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "The Use of Rubbing Compound on Lacquer and Enamel Paint." Follow the procedures outlined by your instructor and compound your panel, checking with your instructor at these points:

   a) Selection of sandpaper

   b) Wet sanding completed

   c) Compound mixed

   d) Small area has been compounded.

   d) Polish applied

   When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

Given two sheet metal panels that have all the necessary undercoats, you will paint and finish the surface. You must finish one surface with lacquer and the other with enamel. You may not use references and you must receive a satisfactory rating on the Student Checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Mixes paint according to shop conditions.	________	________
2. Uses spray gun correctly.	________	________
3. Paints surface without defects.	________	________
4. Applies mist coat correctly.	________	________
5. Uses rubbing compound correctly.	________	________
6. Observes safety precautions.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 08:	Heat dry painted surface
Performance Objective:	Given three vehicles which have been painted, you will describe the flash time, drying time and temperature with 80% accuracy without using references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 198-200, "Paint Drying Equipment," in Auto Body Repairing and Repainting. Answer the following questions.

   a) When is paint baking equipment used most?

   b) Describe radiant bake units.

   c) Describe convection bake units.

   d) What type of baking equipment is a smaller body shop going to have?

   e) Why do you have to consider the color before you can arrive at a baking time?

   f) Why do you have to wait before putting a car into a baking unit?

   Be prepared to discuss your answers in a class discussion. When you have answered the questions satisfactorily, go on to Learning Activity #3.

3. Study the chart on page 86 in Automotive Refinishing Principles and Techniques. Answer the following questions.

   a) What type of paint requires the shorter amount of time?

   b) What type of paint requires the longest "flash time"?

   c) What is the highest temperature recommended? Why?

   d) What type of paint takes the longest time to dry at the highest temperature.

   When you are finished, check your answers with your instructor. If your answers are satisfactory, go on to Learning Activity #4.

Student Competency Sheet - Page 2

4. Make a list of the automobiles in your shop that need to be painted. Describe the temperature and time you would put them in a baking unit. When you are finished, compare your answers with another student. If there are any differences, check with your instructor. If not, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be assigned three vehicles in your shop which have been painted. You must describe the flash time, drying time and temperature with 80% accuracy without using references.

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 09: Refinish automobile with acrylic enamel

Performance Objective: Given an automobile with acrylic enamel, you will refinish doors, roof and rear of an automobile. You may not use references. You must receive a satisfactory rating on all items of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 330-332 in Auto Body Repair. Participate in a class discussion on the proper movement around the vehicle.

3. Your instructor will assign you an automobile which needs an overall paint job. Clean and prepare the hood for painting. When you have completed the work, check with your instructor. If the work is satisfactory, prepare the front fenders for the undercoats. If the work was not satisfactory, complete steps a - g below.

   a) List the causes of your mistakes.

   b) Describe how to correct them.

   c) With your instructor observing, correct your mistakes.

   d) Prepare the right or left fender for painting.

   e) Check your work with your instructor.

   f) If it is satisfactory, prepare the other fender for the undercoat.

   g) If it is not satisfactory, complete steps a-f for the other fender.

   When you have completed preparing the hood and fenders for painting satisfactorily, go on to Learning Activity #4.

4. Mask the lights, grill, trim and accessories on the front of the car. Check your work with your instructor. When it is satisfactory, go on to Learning Activity #5.

5. Prepare and apply the undercoat to front of the automobile. Check with your instructor at the following points. If your work is unsatisfactory at any point, do not go on until your instructor is satisfied with your work.

   a) Selection of reducer.
   b) Reducer and primer-surfacer mixed.
   c) Pressure set on spray gun.
   d) 3 coats of primer-surfacer applied.
   e) 6 coats of primer-surfacer applied.
   f) Block sanding.
   g) Paint putty applied.
   h) Block sanding.
   i) Area compounded.
   j) Area washed and tacked.
   k) Sealer mixed.
   l) Sealer applied.

6. Match and mix the paint according to shop conditions. (Mix enough paint to cover the entire vehicle). Check with your instructor at the following points. If your work is unsatisfactory at any point, do not go on until your instructor is satisfied with your work.

   a) Color is located in chip book.
   b) Color is matched.
   c) Reducer chosen.
   d) Paint mixed.

7. Paint the front of the car. Check your work with your instructor at the following points. If the work is not satisfactory, do not go on until the mistakes are corrected and the instructor is satisfied.

   a) Hidden edges painted (1st coat).

   b) Right or left fender painted (1st coat).

   c) Hood painted (1st coat).

   d) Remaining hood painted (1st coat).

   e) Repeat A-D for second coat.

   f) Paint has dried to the point of removing masking.

   g) Clean and store spray gun.

8. Attend a lecture/demonstration by your instructor on "Refinishing Rubber and Plastic Parts and panels." Take any notes necessary and practice refinishing the parts. When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Using the automobile you painted in the learning activities, you will refinish the doors, roof and rear of the automobile. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Spray gun used and cleaned correctly.		
2. Featheredging 3/4" around repair.		
3. Treats metal correctly.		
4. Uses enamel reducer correctly.		
5. Vehicle masked correctly.		
6. Mixes primer-surfacer according to shop conditions.		
7. Applies primer surfacer smoothly (without runs, sags, or zebra effects).		
8. Paint putty applied and sanded.		
9. Sealer mixed and applied correctly.		
10. Selects correct reducer according to shop conditions.		
11. Mixes correct amount of reducer-thinner according to shop conditions.		
12. Color is matched so that you cannot see any differences under natural light.		

STUDENT CHECKLIST
Continued

	SATISFACTORY	UNSATISFACTORY
13. Painted surfaces without runs, sags, zebra effects, cracks, etc. after drying.	________	________
14. Observes safety precautions.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 10:	Refinish automobile with acrylic lacquer
Performance Objective:	Given an automobile with acrylic lacquer, you will refinish doors, roof and rear of an automobile. You may not use references. You must receive a satisfactory rating on all items of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Your instructor will assign you an automobile which needs an overall paint job. Clean and prepare the hood for painting. When you have completed the work, check with your instructor. If the work is satisfactory, prepare the front fender for the undercoats. If the work was not satisfactory, complete steps a - g below.

   a) List the causes of your mistakes.

   b) Describe how to correct them.

   c) With your instructor observing, correct your mistakes.

   d) Prepare the right or left fender for painting.

   e) Check your work with your instructor.

   f) If it is satisfactory, prepare the other fender for the undercoats.

   g) If it is not satisfactory, complete steps a - f for the other fender.

   When you have completed preparing the hood and fenders for painting satisfactorily, go on to Learning Activity #3.

3. Mask the lights, grill, trim and accessories on the front of the car. Check your work with your instructor. When it is satisfactory, go on to Learning Activity #4.

4. Prepare and apply the undercoat to front of the automobile. Check with your instructor on the following points. If your work is unsatisfactory at any point, do not go on until your instructor is satisfied with your work.

   a) Selection of reducer.

   b) Thinner and primer-surfacer mixed.

   c) Pressure set on spray gun.

   d) 3 coats of primer-surfacer applied.

   e) 6 coats of primer-surfacer applied.

   f) Block sanding.

   g) Paint putty applied.

   h) Block sanding.

   i) Area compounded

   j) Area washed and tacked.

   k) Sealer mixed.

   l) Sealer applied.

5. Match and mix the paint according to shop conditions. (Mix enough paint to cover the entire vehicle). Check with your instructor at the following points. If your work is unsatisfactory at any point, do not go on until your instructor is satisfied with your work.

   a) Color is located in chip book.

   b) Color is matched.

   c) Thinner chosen.

   d) Paint mixed.

6. Paint the front of the car. Check your work with your instructor at the following points. If the work is not satisfactory, do not go on until the mistakes are corrected and the instructor is satisfied.

   a) Hidden edges painted (1st coat).

   b) Right or left fender painted (1st coat).

   c) Hood painted (1st coat).

   d) Remaining hood painted (1st coat).

   e) Repeat A-D for second coat.

   f) Paint has dried to the point of removing masking.

   g) Clean and store spray gun.

7. Attend a lecture/demonstration by your instructor on "Refinishing Rubber and Plastic Parts and Panels. Take any notes necessary and practice refinishing the parts. When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Using the automobile you painted in the learning activities, you will refinish the doors, roof and rear of the automobile. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Spray can used and cleaned correctly.		
2. Featheredging 3/4" around repair.		
3. Treats metal correctly.		
4. Uses enamel reducer correctly.		
5. Vehicle masked correctly.		
6. Mixes primer-surfacer according to shop conditions.		
7. Applies primer surfacer smoothly (without runs, sags, zebra effects).		
8. Paint putty applied and sanded.		
9. Sealer mixed and applied correctly.		
10. Selects correct thinner according to shop conditions.		
11. Mixes correct amount of reducer-thinner according to shop conditions.		

STUDENT CHECKLIST
Continued

	SATISFACTORY	UNSATISFACTORY
12. Color is matched so that you cannot see any differences under natural light.	__________	__________
13. Painted surface is without runs, sags, zebra effects, cracks, etc. after drying.	__________	__________
14. Observes safety precautions.	__________	__________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 11:	Apply pinstriping to automobile
Performance Objective:	Given a sheet metal panel or an automobile which requires both straight line and curved pinstriping, you will paint the pin stripe. You may not use references and you must receive a satisfactory rating on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 477-480 in Total Auto Body Repair and answer the following questions during a class discussion.
   a) At what point in the painting process do you apply pinstriping?
   b) How do you turn curves using striping tape?
   c) Why would you wipe the area to be striped after you pulled out the percut sections of tape? Why not before you apply the tape?
   d) Describe the actual painting of the pinstriping.
3. Apply striping tape to a sheet metal panel. Apply masking and follow the procedures outlined in your reading to pinstripe. Practice until you can paint a pinstripe 6 ft. long that is perfectly straight. Your instructor will check your work. When it is satisfactory, go on to Learning Activity #4.
4. Attend a lecture/demonstration by your instructor on making curves with striping tape. Practice on sheet metal panel checking with your instructor after applying the tape and after you have applied the tape. When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

Given a sheet metal panel or an automobile which requires both straight line and curved pin striping, you will paint the pinstripe using striping tape. If you are using a sheet metal panel, paint the design below.

You may not use references and you must receive a satisfactory rating on each item of the Student Checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Prepares surface correctly.	________	________
2. Applies striping tape straight.	________	________
3. Tape correctly bent or formed for curves.	________	________
4. Area around striping tape mashed correctly.	________	________
5. Applies sealer correctly.	________	________
6. Adjusts spray gun to correct pressure.	________	________
7. Applies paint correctly.	________	________

STUDENT COMPETENCY SHEET

MODULE 04: Painting and Refinishing

Competency Statement 12:	Replace woodgrain panels
Performance Objective:	Given a vehicle which requires the replacement of woodgrain panels, you will remove and replace the transfer without using references. You must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 259-260 in Auto Body Repair. Participate in a class discussion on the following.

   a) What tools are needed to remove the woodgrain transfer?

   b) Why is it important to protect adjoining panels?

   c) How do you find the temperature of an automobile body?

   When you have answers for the above questions, go on to Learning Activity #3.

3. Practice applying and removing woodgrain panels to and from sheet metal panels. Check your work with your instructor at each point listed below.

   a) Removal of old woodgrain.

   b) Surface prepared.

   c) 4" area in center has been applied.

   d) Top of transfer applied.

   e) Entire panel applied.

   f) Transfer folded over door or quarter edges.

   When your instructor is satisfied with your work, go on to Learning Activity #4.

4. Repeat the steps in Learning Activity #3 on an automobile. When your instructor is satisfied with your work, ask for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a vehicle which requires the replacement of woodgrain panels. You will remove and replace the transfer without using references. You must receive a satisfactory rating on all items of the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Uses tools correctly.	________	________
2. Removes exterior molding without causing damage.	________	________
3. Removes old woodgrain correctly.	________	________
4. Prepares surface correctly.	________	________
5. Applies new transfer correctly.	________	________
6. All air bubbles removed.	________	________
7. Installs exterior trim parts correctly.	________	________

STUDENT COMPETENCY SHEET

MODULE 05: Metal Work

Competency Statement 01: Identify the various types of construction used in automobile manufacturing.

Performance Objective: You will demonstrate your knowledge of the various types of construction used in automobile manufacturing by completing a true-false examination with 90% accuracy without using references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Watch the film "The Changing Architecture of the Automobile Body." During and after the film, answer the following questions:
   - a. In what ways have automotive bodies changed?
   - b. How have changes in automotive body construction affected the total automobile?
   - c. Why does a manufacturer change the body style of an automobile?
3. Read pages 1-4 in Automotive Collision Work and answer the following questions:
   - a. What is the term applied to the curved surface formation of metal in auto bodies and fenders?
   - b. How is the strength of large metal sheets or panels affected by angles or flanges formed along their edges?
4. Review the answers with your instructor. If the answers are satisfactory, ask your instructor for the Criterion Evaluation. If not, your instructor will show you the areas you need to study before you can take the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You must answer correctly 9 out of 10 of the following questions. You may not use references.

1. TRUE FALSE A sheet of metal which has been crowned is not as strong as a sheet of flat metal.

2. TRUE FALSE The more a surface is stressed, the less it will resist movement.

3. TRUE FALSE A hood is low crown surface.

4. TRUE FALSE Angles or flanges alond edges weaken the metal.

5. TRUE FALSE If a panel is bent into a right angle it will be stronger.

6. TRUE FALSE Flanges are right angle bends.

7. TRUE FALSE U-Channels are used on the outside of auto bodies for more strength.

8. TRUE FALSE U-Channels are the most common type of construction found in auto frames.

9. TRUE FALSE U-Channels are stronger than box sections.

10. TRUE FALSE Body parts are never a combination of crowns, angles, flanges, U-Channels and box sections.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 02 Identify parts (body and frame) of an automobile.

Performance Objective: You will identify the major sections of an automobile using an actual automobile or illustrated drawing with 100% accuracy. You may not use references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective ask your instructor for the Criterion Evaluation. If not, proceed to Learning Activity #2.

2. Read pages 17-34 in Auto Body Repair. After you have read, take your book and examine different makes of automobiles. List the differences you find in each of the following sections.

   a. Frame
   b. Doors
   c. Trunk lids
   d. Hood
   e. Front fenders
   f. Roof
   g. Cowl panels
   h. Quarter panels
   i. Rocker panels
   j. Underbody
   k. Pillars
   l. Inner panels

Student Competency Sheet - Page 2

3. In a large or small group discuss your findings with other students. If you had trouble locating the various sections, go on to Learning Activity #4. If not, ask your instructor for the Criterion Evaluation.

Alternate Activities:

4. Attend a demonstration/lecture by your instructor on locating parts of an automobile. Complete Learning Activity #2 with other students or your instructor. Make sure you ask the instructor when you cannot locate a particular section of the automobile.

5. Study General Motors Chart "Body Construction" with an automobile near for reference. When you are able to identify the various parts of the automobile ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation: Selection A or B

A. Go to the automobile selected by your instructor and give the name of each section tagged with a number. You may either tell your instructor the name or write it on paper.

B. Get an illustrated drawing from your instructor and name each section tagged with a number.

You may not use references and must identify all sections with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 03 Identify welding processes used in restoring a damaged automobile.

Performance Objective: You will identify on a written exercise the two types of welding used in auto body construction and repair, state the advantages of each process and list two examples of where each process is used. You must be 90% accurate. You may not use references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 58-67 in Autobody Repairing and Repainting and answer the questions on pages 67-68. Check your answers with your instructor.
3. Attend a lecture/demonstration by your instructor on the types of welding used in Autobody Repair. After the lecture, explain to another student the types of welding processes and give at least two advantages of each process.
4. View a filmstrip on the types of welding used in autobody repair. On a sheet of paper give at least two examples of where each could be used in autobody repair. Compare your answers with another student.
5. Ask your instructor for the Criterion Evaluation. If you complete it satisfactorily go on to the next objective. If not, reread the pages listed in Learning Activity #2 and repeat Learning Activity #4.

Student Competency Sheet - Page 2

Criterion Evaluation:

You must complete the following questions with 90% accuracy. You may not use references.

1. What are the two main types of welding used in the body shop?

   a.

   b.

2. List two examples of where you could use each type of welding in auto body repair.

   a.

   b.

3. What type of welding process causes the most amount of heat distortion in metal?

4. What type of welding process would you use to weld a six-inch tear in a sheet metal panel?

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 04 Set up oxyacetylene welding station.

Performance Objective: You will select the different pieces of equipment necessary for an oxyacetylene welding station, and prepare the equipment for welding. You must observe all safety procedures and you may not use references. You must receive a satisfactory rating on each item in the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Study figure 9-3 on Page 60 in Auto Body Repairing and Repainting. Study figures 11-1 on Page 186 in Total Auto Body Repair. Take the books and go to an oxyacetylene welding station and study the equipment until you can identify the following without using references:

   a. Oxygen regulator
   b. Oxygen hose
   c. Acetylene regulator
   d. Acetylene hose
   e. Safety chain
   f. Oxygen cylinder
   g. Oxygen valve
   h. Acetylene valve
   i. Welding torch and tip
   j. Cutting torch
   k. Goggles
   l. Wrench
   m. Lighter
   n. Fire extinguisher

3. Read pages 34-50 in Principles of Auto Body Repairing and Repainting. Discuss the answers to the questions 1 through 12 on pages 86 and 87 in the same book with a large or small group of students.

Student Competency Sheet - Page 2

(Continue Learning Activities from previous page)

4. Attend a lecture/demonstration by your instructor on "Procedure in setting up an oxyacetylene welding station." Take notes on special safety considerations. Discuss your notes with students after the demonstration.

5. Practice setting up an oxyacetylene station until you are ready for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation:

You will select the necessary equipment for an oxyacetylene welding station and assemble the station. You must observe all safety precautions and you may not use references. You must receive a satisfactory on each item on the Student Checklist.

Student Competency Sheet - Page 4

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Selects proper equipment	______	______
2. Cleans surrounding area	______	______
3. Places cylinders in cart correctly	______	______
4. Removes dust from valves (Cracking the valves)	______	______
5. Connects clean regulators to cylinders	______	______
6. Releases pressure adjusting screw	______	______
7. Opens valves slowly	______	______
8. Connects "blown-out hoses"	______	______
9. Attaches torch body to hose	______	______
10. Attaches welding tip to torch	______	______
11. Checks connections for leaks	______	______

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 05 Select tip pressure and flame oxyacetylene welding.

Performance Objective: Given descriptions of three welding tasks to be completed, and an oxyacetylene welding station, you will select the correct tip for each task, set the operating pressure for oxygen and acetylene, and light the torch and adjust to neutral flame. The correct tip and operating pressures must be selected and the torch lit and flame adjusted to neutral, with no more than two attempts for each task. All safety precautions must be followed. You may use any references available.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 122-126 in Automotive Collision Work. Answer question 2, 3, 6, and 13 on page 150. Have your instructor check your answers.

3. Attend a lecture/demonstration given by your instructor on installing tips, adjusting operating pressures for oxygen and acetylene, and lighting the torch and adjusting the flame. As your instructor demonstrates, write down a step-by-step procedure for each major action. After the demonstration have your instructor check the procedures you wrote down. Make any corrections you need to in the procedures.

4. Go to an oxyacetylene station. Practice the following actions. Have your instructor check your work when you have completed each action.

    a. Remove the tip you find on the torch. Install a #1 tip.

    b. Set operating pressures for using the #1 tip to weld 1/16" metal.

Student Competency Sheet - Page 2

c. Light the torch and adjust to a neutral flame.

d. Repeat steps a-c for a #2 tip.

5. Go to an oxyacetylene station. Complete each of the following tasks.

   a. You are going to weld 56 gage metal. Select the correct tip, install it, set the operating pressure for oxygen and acetylene, light the torch, adjust the flame to neutral.

   b. You are going to weld 3/16" metal. Select the correct tip, insert it, set the operating pressure for oxygen and acetylene, light the torch, adjust the flame to neutral.

6. If you have difficulties with Learning Activity #5, your instructor will give you more tasks to perform. If not, ask to complete the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation

You need to complete each of the tasks listed below. First, read the task and then complete it at an oxyacetylene welding station. For each task you should perform as follows: You may use any references available.

1. Select the correct tip.
2. Set oxygen and acetylene to correct operating pressures.
3. Light the torch and adjust to a neutral flame, with no more than two attempts.
4. Follow all safety precautions.

Task 1 - Weld 24 gage metal.

Task 2 - Weld 1/8" metal.

Task 3 - Weld 1/4" metal.

STUDENT COMPETENCY SHEET

MODULE: [illegible] Metal Work

Competency Statement: 06 Cut metal with a gas welder.

Performance Objective: You will use oxyacetylene welding equipment and cut a four-inch square from a 20 gauge sheet metal panel. The square must not be cut more than 4-1/4 inches or less than 3-3/4. It must be cut without burnouts or an undue amount of distortion. You must use all equipment according to shop safety rules.

Learning Activity:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 71-72 in Auto Body Repairing and Repainting, and pages 210-214 in Total Auto Body Repair. Answer the following:
    a. What are the two major things to be done in changing the set-up from welding to cutting?

    b. What safety precautions do you need to take?

    c. What is meant by preheating?

    d. What is the cutting oxygen control handle for?

    e. What are the steps in shutting down for a short time? And what are the steps in shutting down for a long period of time?

Student Competency Sheet - Page 2

(continue Learning Activity from previous page)

3. Attend a lecture/demonstration by the instructor on cutting metal with a gas welder. Get the proper equipment and complete the following:

   a. Cut a two-inch strip off an 8" x 10" 20 gauge sheet metal panel.

   b. Cut a four-inch square from an 8" x 10" 20 gauge sheet metal panel.

   c. Cut a circle three inches in diameter from an 8" x 10" 20 gauge sheet metal panel.

Have the instructor check all your work. All the cuts should be clean without burnouts or an undue amount of distortion. When you feel you have had enough practice ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation:

You will select the proper equipment and cut a four-inch square from a 20 gauge sheet metal pane. You must receive satisfactory ratings on all of the items on the Student Checklist. You may not use references.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Selects proper equipment		
2. Assembles equipment properly		
3. Cuts square within ±1/4"		
4. Cuts square without burnouts		
5. Cuts square without an undue amount of distortion		
6. Observes all safety precautions		

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 07 Perform gas butt welding

Performance Objective: Using oxyacetylene welding equipment and materials, you will butt weld two 20-gauge panels of sheet metal. Tack welds must be made before the bead is run for the butt weld. The weld must be completed without sags, holes, gaps or undue warpage or distortion. The weld must not break when struck with a hammer. You must observe all safety procedures.

Learning Activities:

1. Read the complete Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 99-101 in Auto Body Repair on "Running a Bead". Complete the practice exercises, outlined in the passage. Practice running beads until your instructor is satisfied with your skill.
3. Read pages 101-102 "Butt Joint Welding" in Auto Body Repair. Participate in a lecture/demonstration given by your instructor on the proper procedures to use while welding butt joints. Practice welding butt joints and review your welds with your instructor. Be prepared to explain which welding operations are right or wrong and why. When you are ready ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given two 20-gauge sheet metal panels. Butt weld the panels using oxyacetylene welding equipment. You must observe all safety procedures and you may not use references. You must receive a satisfactory rating on each item on the checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Tack welds were made before the bead was made.	______	______
2. Weld on all joints was without sags, holes or gaps.	______	______
3. Weld did not break when struck with a hammer.	______	______
4. An undue amount of warpage or distortion did not occur.	______	______
5. All safety rules were observed.	______	______

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 08 Perform lap welding operations with a spot weld.

Performance Objective: Given two pieces of sheet metal and arc welder and necessary materials, you will spot weld the lap joint of the pieces of sheet metal. The spot welds should be no more than 1-1/2" apart and the edges must be parallel within ±1/8". The welds must not contain burnouts and must withstand being struck with a hammer.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 72-82 in The Principles of Auto Body Repairing and Repainting. Answer questions 28-34 on page 87 in the same text. Check your answers with other students. Be prepared to discuss your your answers in a class discussion.

3. Attend a lecture/demonstration given by your instructor on the safe use of arc welding equipment. Specifically observe the following:

   a. How to put on and adjust, or how to hold the protective face shield.

   b. How to insert a welding rod into its holder.

   c. How to select and set amperage level.

   d. How to fasten the grounding cable.

   e. How to strike and hold an arc.

4. Now go to an arc welding station and practice Learning Activity #3. Use 1/4" plate as a base metal. After you have practiced the procedure two or three times, demonstrate it to your instructor.

5. Get a piece of 3/16" mild steel. Use a 5/32" rod and an amperage setting of 100-150. Practice running beads using an arc welder. Have your instructor check your work.

Student Competency Sheet - Page 2

6. Get two pieces of 3/16" mild steel. Use a 5/32" rod and an amperage setting of 100-150. Position the pieces of steel for a lap weld. Run beads using an arc welder on both sides of the lap joint.

7. Repeat Learning Activity #6 until you can produce a smooth bead without excessive buildup or blowouts and until the weld holds when struck with a hammer. Have your instructor check your work.

8. Get a piece of 1/16" sheet metal. Use a 5/64" rod and an amperage setting of 25-45. Practice running beads using an arc welder. Have your instructor check your work.

9. Get two pieces of 1/6" sheet metal. Use a 5/64" rod and an amperage setting of 25-45. Position the pieces of sheet metal lap welding. Run beads using an arc welder on both sides of the joint. Have your instructor check your work.

10. Repeat Learning Activity #9, but this time spot weld the lap joint. Place the welds 1" to 1-1/2" apart. Have your instructor check your work.

11. Repeat Learning Activity #10 until you can spot weld the lap joints without burnouts and so they withstand being struck with a hammer. The spot welds should be no more than 1-1/2" apart and the edges must be parallel within ±1/8". When you reach this point in your practice, ask your instructor for the Criterion Evaluation.

Criterion Evaluation

You will be given two pieces of sheet metal. You must use an arc welder to spot weld the pieces together using a lap joint. The spot welds should be no more than 1-1/2" apart and the edges must be parallel within ±1/8". The welds must not contain burnouts and must withstand being struck with a hammer.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 09 Weld automotive framing member with an arc welder.

Performance Objectives: Given arc welding equipment, grinder, and clamps, you will weld a damaged section of an automobile frame and then weld a reinforcement plate over the repaired area. The welds must be completed without sags, burnouts, or gaps and must be uniform without buildup of beads. The welds must not break when struck with a hammer. The reinforcement plate must completely cover the repaired area. You must observe all safety procedures.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objectives, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read page 84 in The Principles of Auto Body Repairing and Repainting and pages 148-149 in Automotive Collision Work. Answer the following questions:

   a. Why is it best to use arc welding equipment when repairing frames?

   b. Is the reinforcement plate welded before or after the break is welded together? Why?

   c. What type of materials are used for the reinforcement plate?

   d. What factors must be considered when deciding where to place the reinforcement plate?

3. Get a section of a damaged frame from your instructor. Use the grinder to prepare the damaged area for repair. Make sure high spots are ground down on both sides of the break and that both sides of the break are slightly beveled. Have your instructor check your work.

Student Competency Sheet - Page 2

4. Take the frame section you prepared in Learning Activity #3 and go to an arc welding station. Using the arc welder, weld the damaged section of the frame. The weld should be without sags, burnouts, or gaps and must be uniform without buildup of beads. Test your weld by striking it with a hammer. Have your instructor check your work.

5. Repeat Learning Activities 3 and 4 until you can weld damaged areas as stated in Learning Activity #4. Have your instructor check your work.

6. Choose any two frame sections you used in Learning Activity #5. Using clamps, position reinforcement plates over the welded areas. Have your instructor check your work.

7. Repeat Learning Activity #6 until you can make acceptable welds and then complete the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation

Using arc welding equipment and materials repair a damaged section of automobile frame by welding the damaged area and then positioning and welding a 1/4" steel reinforcement plate. You must receive a satisfactory rating on each item on the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Reinforcement plate properly positioned.	______	______
2. Welds completed without sags, burnouts, or gaps.	______	______
3. Welds uniform without buildup of beads.	______	______
4. Welds do not break when struck with a hammer.	______	______
5. All safety procedures observed.	______	______

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 10 Perform diagonal checking.

Performance Objective: Given a tram gage, steel tape, and four sheet metal panels, you will complete diagonal checks on each panel. All measurements must be accurate within ± 1/8".

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 63-66 in Automotive Collision Work. Answer these questions.
   a. You think a square panel is bent down on the lower right corner. How would you check it to make sure it was not one of the other three corners that was damaged?
   b. How would you diagonally check a window space on the left side of an auto to see if its frame is damaged?
3. Attend a lecture/demonstration given by your instructor on how to use a tram gage and steel tape for diagonal checking. Write down a step-by-step procedure for using each tool. Have your instructor check your procedure.
4. Go to a work area set up by your instructor. Here you will find two panels - one damaged and one undamaged. First, do diagonal checking on the undamaged panel. Next, do diagonal checking on the damaged panel. Have your instructor check your work.
5. Do diagonal checking on other panels given you by your instructor. When you can measure accurately within ±1/8" ask to take the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

Your instructor will give you four sheet metal panels and a tram gage and steel tape. Do diagonal checks on each panel and report your measurements to your instructor. The measurements must be accurate within ±1/8".

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 11 Identify sheet metal damage.

Performance Objective: Given ten damaged sheet metal panels, you must identify the type and direction of damage without using reference with 80% accuracy.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Attend a lecture/demonstration given by your instructor on analyzing sheet metal damage. Observe carefully the examples the instructor presents. Describe in writing the type of damages and the direction of the damage. Participate in a class discussion of the correct analysis of the damage in the examples presented by your instructor.

3. Complete this Learning Activity with another student. Go to panels or automobiles as directed by your instructor. Examine the panels or autos. Use your notes from Learning Activity #2. Write down the type and direction of damage for each panel or auto. Have your instructor check your work and make necessary corrections.

Student Competency Sheet - Page 2

Criterion Evaluation:

Your instructor will display ten damaged sheet metal panels. You will explain to the instructor, either in writing or orally, the types of damages and the direction of damage on each panel. You may not use references and you must identify the type and direction of damage within 80% accuracy.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 12	Use autobody hammers and dollies to "rough out" sheet metal.
Performance Objective:	Given an assortment of autobody hammers and dollies and two sheet metal panels, you will "rough out" each panel, using direct hammering on one and indirect hammering on the other. The damaged area on each panel must be restored to within 3/8" of their original contour without causing additional damage.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 95-96 in Total Auto Body Repair. Study Figure 5-61 on page 95 until you can identify the various hammers. If this book is not available, study Figure 2-2 on page 15 in Autobody Repairing and Repainting until you can identify the various hammers.
3. Study pages 72-73 and Figures 2-3, 2-4, and 2-5 in Automotive Collision Work until you can identify the various dollies.
4. Read pages 74-80 in Automotive Collision Work. Do the three exercises as described on those pages.
5. Read pages 86-90 in Automotive Collision Work. Get a damaged panel from your instructor. Use a pick hammer and roughing dollie, to "rough out" the damage. Use direct hammering. Have your instructor check your work.
6. Repeat Learning Activity #5 until you can restore damaged panels to within 3/8" of their original contour. Have your instructor check your work.

7. Repeat Learning Activity #5, but this time use indirect hammering. Have your instructor check your work.

8. Repeat Learning Activity #7 until you can restore damaged panels to within 3/8" of their original contour. Have your instructor check your work. Ask to take the Criterion Evaluation.

Criterion Evaluation:

Your instructor will give you two damaged sheet metal panels. Select a hammer and dollie and "rough out" the damaged area on each. Use direct hammering on one and indirect hammering on the other. The damaged areas on each panel must be restored within 3/8" of their original contour without causing additional damage.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 13 Use body file and pick hammer to smooth damaged sheet metal.

Performance Objectives: Given a damaged sheet metal panel, body file, and pick hammer, you will smooth the damaged area on the panel. The panel must be restored within 1/8" of the original contour without additional damage to the panel.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read page 81-84 in Automotive Collision Work. Follow the instructions in the text and have your instructor check your work. Be prepared to explain and demonstrate the following types of filing:

   a. Line Filing

   b. X-Filing

   c. Cross Filing

3. Read pages 85-86 "Pick Hammering" in Automotive Collision Work. Follow the instructions in the text until you can hit a chalk mark from under the surface with 100% accuracy.

4. Read page 53-54 on the uses of pick hammers and files in Auto Body Repair. Get damaged sheet from your instructor and practice finding high and low spots with a file, and correct them using a pick hammer. Have your instructor check your work.

5. Repeat Learning Activity #4 until you can restore damaged panels to within 1/8" of their original contour. When you are ready ask the instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a body file and a pick hammer. Using this equipment locate high and low spots in a damaged sheet metal panel and repair to within 1/8" of its original contour.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 14 Use slide hammer and body spoon to restore damaged sheet metal.

Performance Objectives: Given a damaged sheet metal panel you will select the proper slide hammer and body spoon and restore the sheet metal to within 1/8" of its original contour without causing additional damage.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read page 49-51 in Auto Body Repair. Identify and review the function of each spoon with another student. Answer the following questions:
    a. When are spoons used?
    b. Describe the purpose of a driving spoon, fender bending tool, surfacing spoon, and edging tool.
    c. What is another name for a slapping tool? Drip rail tool?
3. Read pages 97-100 in Total Auto Body Repair, answer the following questions:
    a. When do you use a slide hammer?
    b. Explain briefly the two methods used to hold the slide hammer on sheet metal screws.
    c. Which method is better? Why?
    d. Explain how a pull rod functions.
4. Ask your instructor to give you damaged sheet metal or an automobile on which to practice using body spoons and slide hammers. Practice using the tools until you can restore damaged sheet metal to within 1/8" of its original contour. When you are ready ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a damaged sheet metal panel to repair. You must use a body spoon and slide hammer to smooth the metal. You must restore the metal to within 1/8" of its original contour without causing additional damage.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 15 Shrink a stretched area on a panel.

Performance Objective: Given a damaged sheet metal panel, oxyacetylene welding equipment, shrinking dollie, pick hammer, and water and sponge, you will shrink the damaged area so that the area is no higher than the surrounding area and no additional damage is created. You may not use references and you must observe all shop safety rules.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read page 178-185 in Principles of Auto Body Repairing and Repainting and answer the questions on page 185. Be prepared to discuss your answers in a class discussion.
3. Complete this Learning Activity with another student. One student uses the oxyacetylene welder and the other uses the dollie and hammer. Obtain a sheet metal panel with stretched area on two edges of the panel and with the proper equipment and tools restore each area to within 1/8" of the original contour. Have your instructor check your work.
4. Complete this Learning Activity with another student. Obtain two damaged sheet metal panels which have been "roughed out" to within 1/4" of their original contour. Shrink the stretched metal until there are no high spots. Have the instructor check your work.
5. Repeat Learning Activity #4 until you can restore damaged areas to within 1/8" of original contour. When you are ready ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a 20-gauge sheet metal panel having a stretched spot and the necessary supplies and equipment. Shrink the spot so that it is not higher than the metal immediately surrounding the area and without causing additional damage. You may not use references.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 16 Fill and smooth depressed areas with body solder.

Performance Objectives: Given a sheet metal panel having an area of damage not exceeding 1/4" depth, oxyacetylene welder, solder, oil paddle, and body file, you will fill and smooth the depressed areas with body solder so that there are no grooves, or indentations and no additional damage is caused.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objectives, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read page 207-217 in The Principles of Auto Body Repairing and Repainting. Answer the questions on page 217 and be prepared to discuss your answers in a class discussion.

3. Attend a lecture/demonstration given by your instructor on how to use a disc grinder and muriatic acid to remove rust, paint, and welding oxide from area which is to be filled with solder. After the demonstration, prepare two panels using the different methods. Have your instructor check your work.

4. Take one of the panels you prepared in Learning Activity #3 and apply solder to it using the oxyacetylene welder. First, tin the area and then build up and smooth the solder using the paddle. Have your instructor check your work.

5. Repeat Learning Activity #4 with the other panel you prepared in Learning Activity #3. This time use the body file to smooth the area. Have your instructor check your work.

Student Competency Sheet - Page 2

6. Now you have practiced the complete procedure of filling and smoothing depressed areas with solder. Continue to practice. Have your instructor check your preparation, tinning, soldering, and filing. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given a sheet metal panel which will have an area of damage not exceeding 40 square inches and 1/4" depth, welding equipment and other necessary tools, and equipment. You will fill and smooth the depressed area with body solder so that there are no grooves or indentations. No additional damage may be caused and you must observe all shop safety rules. You may not use references.

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 17 Use light-duty hydraulic straightening equipment.

Performance Objectives: Given a push-pull jack, jack base, adapters, tubing, and caps and a power dolly, you will use the equipment to partially straighten damaged panels such as fenders and trunk lids. You must use each piece of equipment without causing further damage and by straightening the damaged panels within 1/2" of the designated area. All safety precautions must be observed.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Review pages 179-197 in Automotive Collision Work. Read the sections on push-pull jacks, jack bases, adapters, tubing, caps, spoon tools, spreaders, and power dolly. Answer questions 1, 5, 9, 10, 12, 13, 14, 16, and 17 on page 209. Have your instructor check your work.
3. Get a push-pull jack and available jack bases, adapters, tubing, and caps. Set the equipment up in an area, such as the classroom door. Have your instructor check your set-up. Explain how you would use the equipment if you had to apply pressure.
4. Get a power dolly and repeat Learning Activity #3.
5. Your instructor will show you areas to practice using the push-pull jack and the power dolly. In each case your instructor will tell you how much straightening you must do. When you are ready, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Your instructor will show you two panels needing straightening, such as fenders and trunk lids and the amount of straightening that needs to be done. Straighten one panel using the push-pull jack and its attachments and the other using the power dolly. You must straighten both panels within 1/2" of the designated area and without causing additional damage. All safety precautions must be observed.

STUDENT COMPETENCY SHEET

MODULES: 05 Metal Work

Competency Statement: 18 Use plastic filler to restore damaged area.

Performance Objectives: Given a sheet metal panel having an area of damage not exceeding 40 square inches in area and 1/4" in depth, plastic filler, hardner, putty knife, and grinder, you will file and smooth the depressed area with plastic filler so that there are no grooves or indentations exceeding 1/8". You may not use references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read page 120-124 in Auto Body Repair. Answer questions 4-11 on page 131. Discuss your answers with other students in a class discussion.
3. Attend a two-part lecture/demonstration given by your instructor on mixing and applying plastic body filler and then smoothing the filler. While the filler is curing, get a sheet metal panel and prepare it for filling. Use a disc grinder and solvent. Second watch the smoothing of the filler after curing. Watch carefully the selection of sanding discs.
4. Practice the complete procedure for using plastic filler. Have your instructor check your work after preparing it, after application of filler, and after sanding. Repeat this Learning Activity until you are ready for the Criterion Evaluation.

Student Competency Sheet - Page 2

Criterion Evaluation:

You will be given a sheet metal panel having a damaged area not exceeding 40 square inches and 1/4" in depth, and necessary materials and equipment. You must prepare the area, mix and apply the plastic filler, and smooth the filler. You must receive a satisfactory rating on each item on the checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Area prepared for filling.		
2. Plastic filler mixed to a uniform color before application.		
3. Filler applied properly.		
4. Area properly smoothed.		
5. All tools properly used.		

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 19 Use fiber glass to restore a damaged area.

Performance Objective: Given an automobile with body damage, you will repair the area using fiber glass filler. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist. You must observe all safety precautions.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 151-154 in Total Auto Body Repair. Answer the following questions.
   a) What are the advantages of fiber glass fillers? Disadvantages?
   b) List the safety precautions to observe when working with fiber glass.
   c) Describe the procedures to use to prepare a surface for applying matting.
   d) Describe how to cut fiber glass matting.
   e) Describe how to mix the fiber glass resin.
   f) Describe the steps in applying the matting.
   g) Can you use any type of plastic filler over fiber glass matting?

   Discuss your answers in a class discussion.
3. Practice using fiber glass to repair rust outs on a vehicle in your shop. Check your work with your instructor at each of the following points. If your work is not satisfactory, do not go on until you have corrected your mistakes.

Student Competency Sheet - Page 2

a) Area cleaned and sanded.

b) Damaged area "tapped down."

c) Fiber glass matting cut.

d) Fiber glass resin mixed.

e) Matting applied to damaged area.

f) Matting saturated and air bubbles removed.

g) Plastic filler added.

If your work is satisfactory, ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation:

Given an automobile with body damage, you will repair the area using fiber glass filler. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist. You must observe all safety precautions.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Area cleaned and sanded.	______	______
2. Damaged area "tapped down."	______	______
3. Fiber glass matting cut.	______	______
4. Fiber glass resin mixed.	______	______
5. Matting applied to damaged area.	______	______
6. Matting saturated and air bubbles removed.	______	______
7. Plastic filler added.	______	______

STUDENT COMPETENCY SHEET

MODULE: 05 Metal Work

Competency Statement: 20 Repair fiber glass bodies.

Performance Objective: Given a vehicle with a damaged fiber glass body, you will use fiber glass filler to repair the damaged fiber glass. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist. You must observe all safety precautions.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 154-160 in Total Auto Body Repair. Participate in a class discussion on the differences between using fiber glass on metal body parts and using fiber glass on fiber glass body parts.

3. Attend a lecture/demonstration by your instructor on "Repairing Holes in Fiberglass Panels." Practice repairing holes on a fiber glass panel checking with your instructor at the following points. Do not go on if your work is unsatisfactory until you correct your mistakes.

    a) Holes beveled.

    b) Mat cut.

    c) Resin mixed.

    d) Larger mat installed.

    e) Smaller mat installed.

    f) Plastic filler applied.

    g) Area sanded.

    When your work is satisfactory, go on to Learning Activity #4.

Student Competency Sheet - Page 2

4. Attend a lecture/demonstration by your instructor on "Repairing Cracks in Fiber Glass Bodies." Practice repairing the cracks on a fiber glass panel, checking with your instructor at the following points. If your work is unsatisfactory at any point, do not go on until you have corrected the mistakes.

   a) Block sanded.

   b) Mat cut.

   c) Resin mixed.

   d) Double layer of mat applied.

   e) Crack's edges beveled.

   f) Crack filled with resin.

   g) Plastic filler applied.

   When your work is satisfactory, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on"Repairing Shattered Fiberglass Panels." Practice repairing shattered fiber glass panels. Check your work with your instructor at the following points. If your work is unsatisfactory at any point, do not go on until you have corrected your mistakes.

   a) Pieces clamped together.

   b) Resin "bridge" applied.

   c) Outer surface ground.

   d) Backside of panel shingled.

   e) Plastic filler applied to outside.

   When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Student Competency Sheet - Page 3

Criterion Evaluation:

Given a vehicle with a damaged fiber glass body, you will use fiber glass filler to repair the damaged fiber glass. You may not use references and you must receive a satisfactory rating on all items of the Student Checklist. You must observe all safety precautions.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Surface prepared.	______	______
2. Mat(s) cut properly.	______	______
3. Resin mixed correctly.	______	______
4. Mat(s) installed correctly.	______	______
5. Plastic filler applied correctly.	______	______
6. Area prepared for refinishing.	______	______
7. Observed safety precautions.	______	______

STUDENT COMPETENCY SHEET

MODULE 06: Body Alignment

Competency Statement 01: Aligns moveable body components (doors, deck lid and hood)

Performance Objective: Given an automobile which needs door, deck lid, and/or hinge adjustments, you will align the damaged part. You may not use references and you must score a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 337-340, "Door Alignment" in Total Auto Body Repair. After you have read, use the book as a reference and identify the following parts on an automobile in your shop.

   a) Hinges
   b) Latch assembly
   c) Door post
   d) Cowl
   e) Rubber weatherstrip
   f) Rubber bumper

   When you are ready, your instructor will quiz you on the information. If you pass the quiz, go on to Learning Activity #3. If not, continue to study the parts and repeat the quiz when you are ready.

3. Attend a lecture/demonstration by your instructor on "Hinge Adjustment." Take notes to help you adjust the door up and down and in or out. Your instructor will assign you to an automobile. Practice adjusting the hinges. When you are ready, ask your instructor to observe you as you adjust the door up and down, then in or out. When your instructor is satisfied with your work, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Adjusting the Door Striker. Take notes to help you adjust the

door striker so that the door striker moves no more than 1/16 in. when the door is closed. Practice adjusting the striker. When your instructor is satisfied with your work, go on to Learning Activity #5.

5. Read pages 342-345 in Total Auto Body Repair. Using the book as a reference, go to an automobile and study the following parts of a deck lid.

    a) Hinges
    b) Hinge arm
    c) Slotted hole
    d) Caged plates
    e) Shims
    f) Torsion bar
    g) Deck lid lock
    h) Striker plate

    When you are ready, your instructor will quiz you on the information. When you have passed the quiz, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on "Deck Lid Adjustment." Take any notes to help you adjust the up, down, backward or forward. Practice adjusting the hinges by tightening the bolts and using shims. When you are ready, have the instructor observe you adjusting the hinges. If your work is satisfactory, go on to Learning Activity #7.

7. Attend a lecture/demonstration by your instructor on "Adjusting the Torsion Bar." Take any notes necessary and practice adjusting the torsion bar, observing safety precautions. When you are ready, have your instructor check your work. If it is satisfactory, go on to Learning Activity #8.

8. Attend a lecture/demonstration by your instructor on "Adjusting the Deck Lid Lock." Take notes and practice adjusting the lock assembly and striker plate. When you are ready, ask your instructor to check your work. If it is satisfactory, go on to Learning Activity #9.

9. Read pages 332-335, "Hood Adjustments," in Total Auto Body Repair. Using the book as a reference, go to an automobile and identify the following parts of a hood.

    a) Hood hinge.
    b) Striker bar.
    c) Safety catch.
    d) Latch assembly.
    e) Cowl panel.
    f) Height adjustment screws.
    g) External hood release.
    h) Internal hood release.

When you are ready, your instructor will quiz you on the information above. When you have passed the quiz, go on to Learning Activity #10.

10. Attend a lecture/demonstration by your instructor on "Hood Hinge Adjustment." Take any notes and practice adjusting the hinge. CAUTION--When lowering the hood, take care not to bend or chip the paint. When you are ready, your instructor will observe you making hinge adjustments. When your work is satisfactory, go on to Learning Activity #11.

11. Attend a lecture/demonstration on "Adjusting the Hood Height" by your instructor. Take any notes necessary and practice adjusting the height of the hood. When you are ready, your instructor will observe you making the height adjustments. If your work is satisfactory, go on to Learning Activity #12.

12. Attend a lecture/demonstration by your instructor on "Adjusting the Hood Latch." Take any notes necessary and practice adjusting the hood latch. When you are ready, your instructor will observe you making the adjustments. If your work is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given an automobile which needs door, deck lid, and/or hood adjustments. You will align the damaged part. You may not use references and you must score a satisfactory rating on all items on the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Adjust door hinges correctly.		
2. Adjust door striker correctly.		
3. Adjust deck lid hinges correctly.		
4. Adjust deck lid tension bar correctly.		
5. Adjust deck lid lock correctly.		
6. Adjust hood hinge correctly.		
7. Adjust hood height correctly.		
8. Adjust hood latch correctly.		
9. Observes all safety precautions.		
10. Does not cause damage to paint or automobile body.		

STUDENT COMPETENCY SHEET

MODULE 06: Body Alignment

Competency Statement 02: Remove and install fenders.

Performance Objective: Given a vehicle that needs the fender replaced and an electric drill, oxyacetylene welding equipment, power chisel, vice grips or clamps, you will remove, replace and align the fender without damaging the vehicle or replacement fender. You must observe all shop safety rules and the weld must meet the following standards.

a. the puddle must not fall through the gap.

b. the metal added from the rod must be thoroughly fused with the base metal on both sides of the joint for the entire thickness of the metal.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 78-80 "Removing a Fender Panel" and "Replacing a Complete Panel" in Auto Body Repairing and Repainting. Answer the following questions:

   a. How do you remove panels that have been spot welded? Fusion welded?

   b. List two ways to determine where the welds are located.

   c. What should be done after you remove the old fender and before you install the new fender?

   d. Briefly describe the welding process in replacing a fender.

Student Competency Sheet - Page 2

Learning Activities:

Have the instructor check your answers.

3. Attend a lecture/demonstration on "Removing and Installing Fenders." After the lecture/demonstration, practice removing and installing a fender. Ask the instructor to check your progress.

4. Take the Criterion Evaluation. If you complete the evaluation satisfactorily, proceed to the next objective; if not, ask your instructor which alternate learning activities you should complete.

Alternate Activities:

5. For a review of welding procedures, read "Welding Practice" pages 61-63 in Auto Body Repairing and Repainting. Practice welding until the weld meets the following standards.

    a. the puddle must not fall through the gap.

    b. the metal added from the rod must be thoroughly fused with the base metal on both sides of the joint for the entire thickness of the metal.

6. For a review of aligning panels, read pages 95-96 "Fender Adjustments" in Auto Body Repairing and Repainting. Check with your instructor and practice aligning a panel.

Student Competency Sheet - Page 3

Criterion Evaluation:

You will be given a vehicle that needs the fender replaced and you will remove, replace and align the fender. Your performance will be rated on the checklist below. You must be rated satisfactory on each item.

CRITERION EVALUATION CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Observes all shop safety rules.		
2. Selects proper hand tools.		
3. Removes fender without damage to vehicle.		
4. Uses hand tools correctly.		
5. Aligns fender properly before welding.		
6. Welds new fender:		
a. Puddle does not fall through gap.		
b. Welding rod fused correctly.		
7. Installs new fender without damage to vehicle.		

STUDENT COMPETENCY SHEET

MODULE 06: Body Alignment

Competency Statement 03: Align headlights

Performance Objective: Given a vehicle which requires adjustment of the headlights, you will adjust the headlights using a floor layout. You may not use references and you must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 305-306 in The Principles of Auto Body Repairing and Repainting and answer the following questions.

   a) What is the difference between two-seal beams and four-seal beam systems?

   b) Describe the conditions of the trunk, tires, gas tank, etc. before you adjust the headlights.

   c) Describe the floor layout to use if headlight adjusting equipment is not available.

   d) Describe the wall layout to use if adjusting equipment is not available.

   e) What is the WV law concerning headlights?

   f) How can you tell if the headlights are adjusted?

   Discuss your answers during a class discussion. When they are correct, go on to Learning Activity #3.

3. With a group of students, lay out the wall and floor using masking tape, according to the diagram on page 306 in The Principles of Auto Body Repairing and Repainting. Check your layout with your instructor. If it is satisfactory, go on to Learning Activity #4.

4. Practice aligning headlights using the floor and wall diagram you laid out in Learning Activity #3. When you are ready, ask your instructor to observe your work. When it is satisfactory, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on 'Using Headlight Adjusting Equipment." Take notes and practice adjusting the headlights. When you are ready, your instructor will check your work. If it is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given an automobile which needs headlight adjustments. You will adjust the headlights using a floor layout. You may not use references and you must receive a satisfactory rating on all items on the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Car prepared for alignment.	__________	__________
2. Car positioned on floor correctly.	__________	__________
3. Number 1 headlight adjusted correctly.	__________	__________
4. Number 2 headlight adjusted correctly.	__________	__________
5. Headlights properly tightened.	__________	__________

STUDENT COMPETENCY SHEET

MODULE 06: Body Alignment

Competency Statement 04:	Align front end
Performance Objective:	Given a vehicle which requires wheel alignment, you will adjust the caster, camber and toe in to manufacturer's specifications. You may use references. You must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can perform the Performance Objective, ask the instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 260-270 in The Principles of Auto Body Repairing and Repainting and answer the following questions during a class discussion.

   a) Define caster.

   b) Define camber.

   c) Define toe in.

   d) Why is McPherson Front Suspension different as far as adjusting wheel alignment?

   When you have answered the questions, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on "Adjusting the Caster." Take notes and list the most commonly used shims, strut rod, eccentric bolts, bushings, and pins. Your instructor will demonstrate how to adjust the caster with the equipment available in your shop. Practice adjusting the caster until you can align it correctly. When you are ready, have the instructor observe your work. If it is satisfactory, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Adjusting the Camber." Take notes and list the most commonly used shims, eccentric bolts, bushing pins and oversize bolt holes. Practice adjusting the camber until you can adjust it so that it places the turning point of the wheel at the center of the tire-to-road contact area. When you are ready, your instructor will observe your work. If it is satisfactory, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on "Adjusting Toe-in." Take notes to ensure you know how to use the equipment in your shop to turn the tie-rod ends. Practice adjusting the toe in. When you are ready, your instructor will observe your work. If it is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Given a vehicle that is out of alignment, you will adjust the camber, toe in and caster to align the wheels. You may use an instruction booklet that goes with the equipment in your shop. You must receive a satisfactory rating on all items on the Student Checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Selects proper shims, strut rods, eccentric bolts and bushings to adjust the caster.	________	________
2. Caster adjusted to manufacturer's specifications.	________	________
3. Proper shims, eccentric bolts and bushings selected to adjust camber.	________	________
4. Camber adjusted to manufacturer's specifications.	________	________
5. Toe in adjusted according to manufacturer's specifications.	________	________
6. All safety rules observed.	________	________

STUDENT COMPETENCY SHEET

MODULE 06: Body Alignment

Competency Statement 05:	Remove and install fiber glass panel
Performance Objective:	Given a fiber glass vehicle which requires the replacement of a panel, you will remove and install a replacement without causing damage to the body or replacement panel. You may not use references and you must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 171-172 in Auto Body Repair and participate in a class discussion on the differences in replacing a fiber glass panel and a metal panel.

3. Attend a lecture/demonstration by your instructor on "Removing a Fiber Glass Panel." Take notes and practice removing a fiber glass panel. When you are ready, have your instructor check your work. If it is satisfactory, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Installing a Fiber Glass Panel." Practice installing a panel checking with your instructor at the following points. If your work is not satisfactory at any point, do not go on until you have corrected your mistakes.

   a) Matting surface cleaned and roughed.

   b) Two panels joined with adhesive.

   c) Panels clamped.

   When your work is satisfactory, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Given a fiber glass vehicle which requires the replacement of a panel, you will remove and install a replacement without causing damage to the body or replacement panel. You may not use references and you must receive a satisfactory rating on all items on the Student Checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Damaged panel removed without causing damage to body.	________	________
2. Adhesive used correctly.	________	________
3. Panel aligned correctly.	________	________
4. Clamps used without causing damage to body.	________	________
5. Bond strong enough to pass rigidity test.	________	________

STUDENT COMPETENCY SHEET

MODULE 07: Frame Work

Competency Statement 01:	Analyze extent of damage to frame
Performance Objective:	Given an automobile with frame damage, you will set up the necessary frame gauge equipment. You will inspect and tram to determine the damage. You will list the findings and measurement of damage as well as the vehicle true specifications. You may use a manufacturer's manual or blueprint as a reference. Findings and measurements must be 100% accurate.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 238-242 in The Principles of Auto Body Repairing and Repainting. List the advantages and disadvantages of the following types of frames.

   a) Perimeter frame.

   b) X-type frame.

   c) Ladder frame.

   d) Unitized construction.

   e) Unitized with bolt-on stub frame.

   f) Platform construction.

   Check your answers with your instructor. Be prepared to discuss them with the class as well as the "concept of four-controlling points."

3. Read pages 78-83 in Auto Body Repairs and be prepared to answer the following questions during a class discussion.

   a) What kind of damage will self-centering frame gauges detect?

   b) Describe the self-centering gauges if the vehicle is in alignment side-to-side and up-and-down.

   c) Define sag damage.

   d) Define datum line.

   e) Describe the frame gauge when sag damage is present.

f) Define sway damage.

g) Where do you put the frame gauge to determine sway damage?

h) Describe the frame gauge when sway damage is present.

i) Define twist damage.

j) Describe how to measure for sway damage and the position of the gauge when twist damage is present.

k) What is a tram gauge used for?

l) Define mash damage.

m) Describe how to check for mash damage and the position of the gauges when mash damage is present.

n) Define diamond condition.

o) Describe how to check for diamond condition and the position of the gauges when a diamond condition exists.

When you have the correct answers for the questions above, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Using a Manufacturer's Manual to find the Correct Dimensions for the Understructure." Select five automobiles in your shop. For:

Car 1 -- find the manufacturer's dimension for "A"

Car 2 -- find the manufacturer's dimension for "a"

Car 3 -- find the manufacturer's dimension for "D"

Car 4 -- find the manufacturer's dimension for "c"

Car 5 -- find the manufacturer's dimension for "e"

Check your answers with your instructor. If your answers are correct, go on to Learning Activity #5.

5. Set up the necessary frame gauge equipment and inspect a vehicle for sag damage, sway damage, twist damage, mash damage and diamond condition. Record all damage requiring corrections. Beside each damaged measurement, record the manufacturer's blueprint specifications. Check with your instructor before you begin inspection. Check to make sure the equipment is set up properly. When your instructor is satisfied with your work, ask for the Criterion Evaluation.

Criterion Evaluation:

Your instructor will assign you to a vehicle. Set up the necessary gauge equipment and determine the damage. You must list the damage, record the damage measurement, and the vehicle's true alignment according to a manufacturer's manual. Your findings must be 95% accurate.

STUDENT COMPETENCY SHEET

MODULE 07: Frame Work

Competency Statement 02:	Align frame using portable or stationary frame equipment
Performance Objective:	Given a vehicle with body and frame damage, you will straighten the frame to original dimensions according to manufacturer's specifications without causing damage to the equipment or the vehicle.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2. If your shop is equipped with a portable frame straightening machine, complete the activities in Part I. If you have stationary frame straightening equipment, complete the activities in Part II.

PART I
TO BE USED FOR PORTABLE FRAME STRAIGHTENING

2. Attend a lecture/demonstration by your instructor on the "Positions to Hold and Positions to Apply Pressure for Each Type of Frame." Take notes and study each vehicle in your shop. When you are ready, your instructor will give you a quiz on the information. When you have passed the quiz, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on "Safety Precautions." You will be expected to observe all of the precautions at all times.

4. Attend a lecture/demonstration by your instructor on the parts of a portable frame and body aligner. Take notes so that you can identify each part and its function. Study your notes and a portable frame and the body aligner your instructor used in the demonstration. When you are ready, your instructor will quiz you on the information. When you pass the quiz, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on setting up a portable frame machine. Practice setting up and tearing down the equipment until you can do so without assistance. When you are ready, ask your instructor to observe your work. If it is satisfactory, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on "Using Heat on Straightening" and answer the following questions.

   a) Is using heat to straighten a frame wise?

   b) What equipment is used to heat the frame?

   c) Describe how to apply the heat.

7. Attend a lecture/demonstration by your instructor on "Aligning a Frame with Sway Damage." Take notes to ensure you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames with sway damage. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #8.

8. Attend a lecture/demonstration by your instructor on "Aligning a Frame with Side-rail Sag." Take notes to ensure you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames with side rail sag. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #9.

9. Attend a lecture/demonstration by your instructor on "Aligning a Frame That is Mashed or Buckled." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that are mashed or buckled. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #10.

10. Attend a lecture/demonstration by your instructor on "Aligning a Diamond Frame." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that have diamond damage. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #11.

11. Attend a lecture/demonstration by your instructor on "Aligning a Twisted Frame." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that have twisted frames. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #12.

12. Practice using the portable frame machine on automobiles in your shop. Check with your instructor at each of these points.

    a) Identification of damage.

    b) Hook up.

    c) Application of heat.

    d) Application of pressure.

    Your instructor will tell you when you are ready to take the Criterion Evaluation.

PART II
TO BE USED WITH STATIONARY FRAME EQUIPMENT

2. Attend a lecture/demonstration by your instructor on the "Positions to Hold and Positions to Apply Pressure for Each Type of Frame." Take notes and study each vehicle in your shop. When you are ready, your instructor will give you a quiz on the information. When you have passed the quiz, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on "Safety Precautions." You will be expected to observe all of the precautions at all times.

4. Attend a lecture/demonstration by your instructor on "The Parts of a Stationary Frame and Body Aligner." Take notes so that you can identify each part and its function. Study your notes and a stationary frame and the body aligner your instructor used in the demonstration. When you are ready, your instructor will quiz you on the information. When you pass the quiz, go on to Learning Activity #5.

5. Attend a lecture/demonstration by your instructor on "Preparing a Stationary Frame Machine." Practice setting up and tearing down the equipment until you can do so without assistance. When you are ready, ask your instructor to observe your work. If it is satisfactory, go on to Learning Activity #6.

6. Attend a lecture/demonstration by your instructor on "Using Heat on Straightening" and answer the following questions.

   a) Is using heat to straighten a frame wise?

   b) What equipment is used to heat the frame?

   c) Describe how to apply the heat.

7. Attend a lecture/demonstration by your instructor on "Aligning a Frame with Sway Damage." Take notes to ensure you know where to apply the heat, where you push, and where to hold. Your instructor will give you illustrations of frames with sway damage. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #8.

8. Attend a lecture/demonstration by your instructor on "Aligning a Frame with Sway Damage." Take notes to ensure you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames with side rail sag. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #9.

9. Attend a lecture/demonstration by your instructor on "Aligning a Frame That is Mashed or Buckled." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that are mashed or buckled. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #10.

10. Attend a lecture/demonstration by your instructor on "Aligning a Diamond Frame." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that have diamond damage. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #11.

11. Attend a lecture/demonstration by your instructor on "Aligning a Twisted Frame." Take notes to ensure that you know where to apply the heat, where you push, and where you hold. Your instructor will give you illustrations of frames that have twisted frames. Show by arrows the direction you would push, where you would hold, and where you would apply heat. Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #12.

12. Practice using the stationary frame machine on automobiles in your shop. Check with your instructor at each of these points.

    a) Identification of damage.

    b) Hook up.

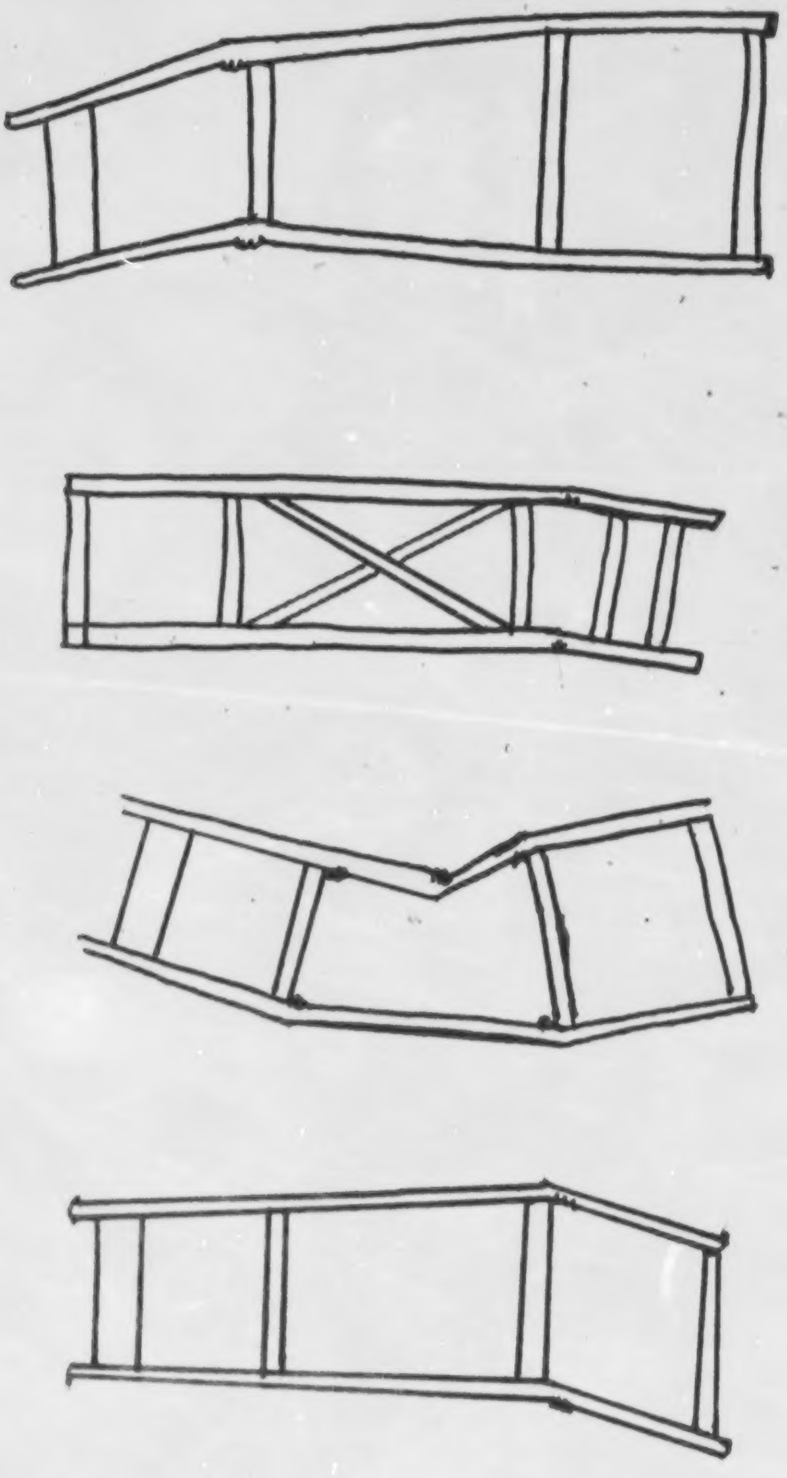
    c) Application of heat.

    d) Application of pressure.

    Your instructor will tell you when you are ready to take the Criterion Evaluation.

Criterion Evaluation:

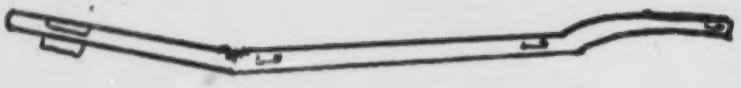
You will be given a vehicle with body and frame damage, and you will straighten the frame to original dimensions according to manufacturer's specifications without causing damage to the equipment or the vehicle.

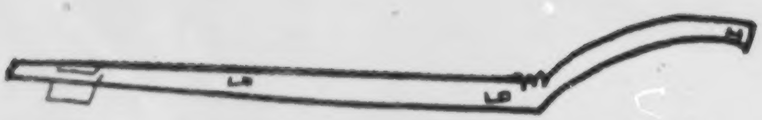


SWAY DAMAGE

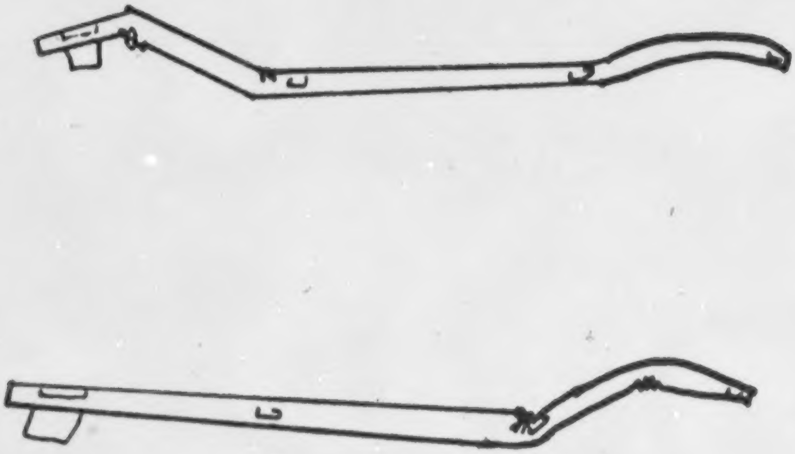
Competency Statement 02: Align frame using portable or stationary frame equipment

Learning Activity #8

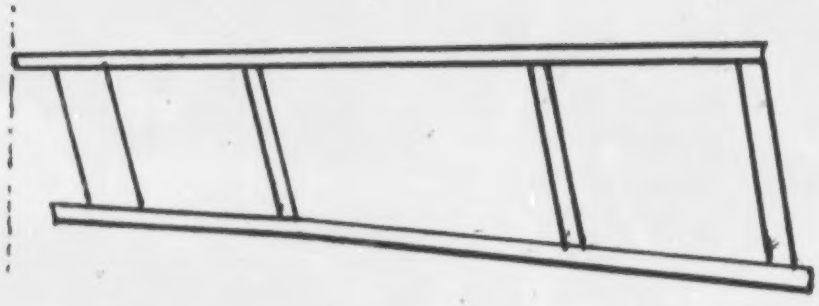




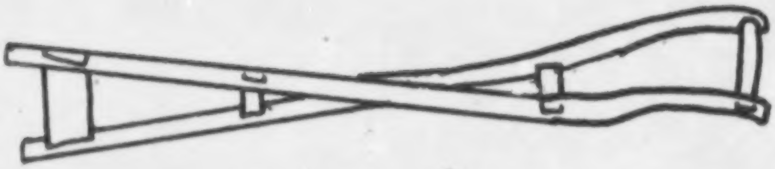
SIDE RAIL SAG



FRAME MASHED AND BUCKLED



DIAMOND DAMAGE



TWISTED FRAME

STUDENT COMPETENCY SHEET

MODULE 07: Frame Work

Competency Statement 03: Repair frame horn and crossmember

Performance Objective: Using crossbeam, chains and hydraulic jack, you will straighten the frame horn and crossmember to meet manufacturer's specifications. You must observe all safety precautions and you must not cause additional damage to vehicle or equipment.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 284-285 in Total Auto Body Repair and answer the following questions.

   a) Which is the smallest type of damage--damage to the frame horn or damage to the crossmember?

   b) Describe how to repair frame horn damage.

   c) What kind of accidents usually cause crossmember damage?

   d) Describe how to correct crossmember damage.

   Check your answers with your instructor. If they are satisfactory, go on to Learning Activity #3.

3. Attend a lecture/demonstration by your instructor on "Repairing Frame Horn Damage." Practice repairing damaged frame horns. When you are ready, have the instructor check your work. If it is satisfactory, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on "Repairing Crossmember Damage." Practice repairing crossmember damage. When you are ready, have the instructor check your work. If it is satisfactory, ask for the Criterion Evaluation.

Criterion Evaluation:

Given an automobile with either frame horn or crossmember damage, you will repair the damage using chains, hydraulic jack and cross-beam. Your repair must meet manufacturer's specifications. You must observe all safety precautions and you must not cause any additional damages to the vehicle or equipment.

STUDENT COMPETENCY SHEET

MODULE 07: Frame Work

Competency Statement 04:	Reinforce frame
Performance Objective:	Given a frame that has been straightened, you will select the location of reinforcement, the material to use, and reinforce the frame. You must use all hand tools properly. You must observe all safety precautions and you must not cause any additional damage to equipment or automobile.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read page 293 in Automotive Collision Work and prepare to answer the following questions in a class discussion.

   a) Why are reinforcements necessary?

   b) What materials are reinforcements made of?

   c) How are reinforcements installed?

   d) Where are reinforcements installed?

3. Read pages 270-272 in Automotive Collision Work, "Riveting of Rigid Frames." Answer the following questions.

   a) List the tools you need to install rivets.

   b) List the dangers involved in riveting.

   c) Why is it important to use hot rivets?

   d) How do you heat the rivets?

   e) Describe the procedure to install rivets.

   Check your answers with your instructor. If they are correct, go on to Learning Activity #4.

4. Attend a lecture/demonstration by your instructor on the "Use of Air and Electrically Operated Rivet Guns." Practice riveting on an I-beam until you can work fast and efficiently in installing rivets. When you are ready, ask your instructor to check your work. If it is satisfactory, go on to Learning Activity #5.

5. Your instructor will assign you an automobile which needs the frame reinforced. Complete the following steps, checking with your instructor before you go on.

   a) Inspect the frame for damage.

   b) Select location for reinforcement.

   c) Select material for reinforcement.

   d) Install reinforcement.

   Complete these steps until your instructor tells you to take the Criterion Evaluation.

Criterion Evaluation:

You will be given a frame that has been straightened and you will select the location of reinforcement, the material to use, and reinforce the frame. You must use all hand tools properly. You must observe all safety precautions and you must not cause any additional damage to equipment or automobile.

STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 01: Explain why collision estimates may vary

Performance Objective: You will explain why collision estimates may vary by answering ten questions, orally or written, without using references with 80% accuracy.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 333-336 in Automotive Collision Work and answer questions 11-14 on page 336. When you have answered the questions, check your answers with your instructor.

3. Participate in a class discussion led by your instructor on the different types of estimating listed below. During the discussion, make notes on why the estimates are different.

   a) Courtesy estimate.

   b) Noncompetitive estimate.

   c) Competitive estimate.

4. Select one of the automobiles in your shop and explain why the estimate would be different if the customer wanted a courtesy estimate vs. an actual cost. Report your findings to the class.

5. Attend a lecture by your instructor on "Hidden Costs." Take notes and be prepared to explain in a class discussion why the following conditions may make an estimate vary.

   a) Underseal needs removed and replaced.

   b) There is a lot of grease on a car that needs painted.

   c) Parts need aligned next to parts being replaced.

   d) Rusted bolts.

   e) Holes on the new parts need plugged and finished.

   f) Windshield shattered on the inside of a car.

   g) Brackets, braces or reinforcements need to be transferred from old part to new part.

6. Attend a lecture by your instructor on the importance of overlap charges in estimating. After the lecture, select an automobile and identify any general overlap that you can see in repairing the automobile. Report your findings to the class. After you complete this learning activity, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will answer questions with 80% accuracy either orally or written which require explaining why collision estimates may vary. You may not use references.

Define the following and explain why they may make collision estimates vary.

1. Courtesy estimate

2. Noncompetitive estimate

3. Competitive estimate

4. Overlap charges

List six factors which can be hidden costs when estimating.

5.

6.

7.

8.

9.

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STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 02:	Identify extent of damages on automobile needing repair
Performance Objective:	Given an automobile needing repair, you will identify the extent of damage with 90% accuracy without using references.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Attend a lecture by your instructor on Basic Estimating Procedures. Take any notes necessary and discuss the following with the class.

   a) Why is it important to start estimating from the outside of the car and go inward on each damaged panel?

   b) Is it the auto body repairer's responsibility to list mechanical repairs needed?

   c) What special care should be taken when estimating frame damage?

3. Get a copy of Mitchell's Estimating Guide and read "Procedure Explanations" on page 5. The procedure is arranged from front to rear and from outside the car inward, are about 30 subsections. Attend a demonstration by your instructor on identifying damage in the front of an automobile. Refer to the estimating guide and take any notes needed to help you identify all the parts in the following subsections.

   Front bumper

   Grille

   Front body

   Front lamps

   Hood

   Front fender

   Front suspension

   Wheel & brakes

   Steering linkage

   Steering column

   Windshield

4. Go to the automobiles in your shop which have front end damage. From the outside, in, list the damage for each automobile. Check your work with your instructor after you have examined each car. When you can identify the front end damage satisfactorily, go on to Learning Activity #5.

5. Attend a demonstration by your instructor on identifying damage to the frame and underbody. Use Mitchell Collision Estimating Guide as a reference and take any notes necessary to help you identify the damage on the following sections.

   Frame

   Exhaust

   Front suspension

   Wheel & Brakes

   Fuel tank

   Rear axle

   Rear suspension

   Examine each automobile in the shop which has damage to the frame and underbody. List the damages and check your work with your instructor after you examine each auto. When you can identify damage to the frame and underbody satisfactorily, go on to Learning Activity #6.

6. Attend a demonstration by your instructor on identifying side damage. Use Mitchell Collision Estimating Guide as a reference and take any notes necessary to help you identify the damage on the following sections.

   Cowl & Dash

   Rocker panel and center pillar

   Seat

   Front and rear door

   Windshield

   Roof

   Convertible top

Examine each automobile in the shop which has damage to the frame and underbody. List the damages and check your work with your instructor after you examine each auto. When you can identify damage to the side satisfactorily, go on to Learning Activity #7.

7. Attend a demonstration by your instructor on identifying rear damage. Use Mitchell Collision Estimating Guide as a reference and take any notes necessary to help you identify the damage on the following sections.

   Back window

   Quarter panel

   Quarter glass and parts

   Quarter molding

   Luggage lid

   Rear bumper

   Rear body

   Rear lamp

   Rear gate

   Deck lid

   Examine each automobile in the shop which has rear damage. List the damages and check your work with your instructor after you examine each automobile. When you can identify damage to the side satisfactorily, go on to Learning Activity #8.

8. Without using references, select an automobile in the shop and identify all of the damage to the automobile. Check your work with your instructor. Practice on as many automobiles necessary until you can identify all of the damage satisfactorily. Ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Given an automobile needing repair, you will identify the extent of damage with 90% accuracy without using references. Your inspection of the automobile must be made from the outside inward.

STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 03: Use collision guide to compute costs of parts and labor for a damaged automobile

Performance Objective: Given an automobile in need of repair, you will compute the costs of parts and labor for the damaged automobile using a collision guide. Your totals must be 100% accurate and you must receive a satisfactory rating on each item of the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Get a copy of Mitchell Collision Estimating Guide and read p. 3, "Definitions," and review p. 11-12, "Abbreviations used." Study the definitions until you are ready to be quizzed on their meaning by your instructor. You may use a reference to determine the abbreviations--but in time you will become familiar with most of them. When you complete the quiz satisfactorily, go on to Learning Activity #3.

3. Attend a lecture by your instructor on identifying the model and make of an automobile and how it applies to your using the Model ID section in Mitchell's Collision Estimating Guide.

4. Attend a lecture by your instructor on identifying the part number price and time estimate in a collision guide. Take any notes necessary. Your instructor will assign you a damaged automobile or a section of a damaged automobile. List the parts damaged, what must be done to repair it, and then list the time estimate and part numbers. Practice this exercise until you can complete the information with 100% accuracy.

5. Attend a lecture by your instructor on using a conversation table for converting labor times to dollars. After the lecture, compute the labor costs for the exercise you completed in Learning Activity #4. Check your work with your instructor. When you have completed the work satisfactorily, go on to Learning Activity #6.

6. Review your estimates and compute overlap charges and make sure there are no special considerations you have left out. Check your final estimates with your instructor. When you have completed the work satisfactorily, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be assigned an automobile in need of repairs. You will compute the cost of parts and labor using a collision guide. Your totals must be 100% accurate and you must receive a satisfactory rating on each item of the Student Checklist.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Identified abbreviations correctly.	________	________
2. Identified make and model of automobile.	________	________
3. Identified all parts required.	________	________
4. Identified labor hours.	________	________
5. Converted hours to dollars with 100% accuracy.	________	________
6. Noted any overlap charges or special considerations.	________	________
7. Figures of estimate computed with 100% accuracy.	________	________

STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 04:	Complete estimate form for a damaged automobile
Performance Objective:	Given an automobile in need of repair, you will complete an estimate form for a damaged automobile with 100% accuracy. You may use a collision guide for reference.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read "Using an Estimating Form," p. 392-396 in Auto Body Repair. After you have read, be ready to participate in a class discussion on the following:

   a) Why should you keep a copy of the estimate form?

   b) Why should you include parts numbers on the estimate form?

   c) Why would you list all related parts together?

   d) What do you do if there is no source available for the cost of a certain piece?

   e) Do you include the subcontractor's price in your estimate?

   f) Should you include phone calls, express charges and tax costs on the estimate?

   g) Are you responsible if you sign your name to the estimate form?

3. Your instructor will select an automobile in your shop and will demonstrate how to compute an estimate form. Take any notes necessary. After the demonstration, you will be assigned an automobile. Complete an estimate form for the automobile. Check your work with your instructor. When you have completed the work satisfactorily, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

You will be given an automobile in need of repair. Complete an estimate form for the repairs with 100% accuracy. You may use a collision guide for reference.

STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 05: Verify insurance coverage

Performance Objective: Given the necessary information, you will list the proper procedure to verify insurance coverage for a customer. You may not use references and you must receive a satisfactory rating on all items on a Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.

2. Read pages 41-44 in Total Auto Body Repair, and define the following.

    a) No-insurance jobs
    b) Third party claims
    c) First party claims
    d) Liability coverage
    e) Collision coverage
    f) Comprehensive coverage
    g) Deductible

    Check your defintions with your instructor. If your definitions are correct, go on to Learning Activity #3.

3. Attend a lecture by your instructor. During the lecture, your instructor will give the details on why each automobile is in need of repair. First, list each automobile on your paper and identify what type of claim is involved, and then list the type of insurance coverage which would pay for the repairs. Do not use any references. When you complete the exercise satisfactorily, go on to Learning Activity #4.

4. Attend a lecture by your instructor on Verifying Insurance. Take notes and be prepared to discuss how to handle the following situations. When you are ready, ask your instructor for the Criterion Evaluation.

   a) A customer gives you the name of a national insurance company, but not the policy number or agent's name.

   b) A customer gives you only the agent's name.

   c) A customer gives you the name of his attorney.

   d) You call the agent and the agent denies coverage.

   e) A customer gives you the name of an agent who handles the insurance for the party who caused the damage.

Criterion Evaluation:

Given the following case descriptions, list the procedures you would use to verify insurance coverage. You must receive a satisfactory rating on each item of the checklist and you may not use references.

CASE DESCRIPTIONS

1. Rachel Grumppe brings in her car to be repaired. The person who hit her lives out of state. She has the policy number and the agent's name .
2. The owner of the shop where you work brings in his case and tells you his insurance will pay him for the work and he wants an estimate given to him.
3. A customer gives you an agent and policy number but the insurance company denies having a policyholder by that name.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. Procedures listed lead to verification of insurance.	______	______
2. Procedures do not take sides with customers or insurance companies.	______	______
3. Procedures do not violate customer's legal rights.	______	______

STUDENT COMPETENCY SHEET

MODULE 08: Estimating

Competency Statement 06:	Order parts and materials
Performance Objective:	Given a vehicle in need of repair, you will identify the parts and materials needed and you will list the proper procedures to order the parts and materials, either orally or in writing. You may use a collision estimating guide as a reference and you must receive a satisfactory rating on all items on the Student Checklist.

Learning Activities:

1. Read the entire Student Competency Sheet. If you can complete the Performance Objective, ask your instructor for the Criterion Evaluation. If not, go on to Learning Activity #2.
2. Read pages 35-41 in Total Auto Body Repair, "Parts and Availability." After you have read, be prepared to discuss the following.
   a) When is it better to use used parts?
   b) What special care do you have to take using used parts?
3. Attend a lecture/demonstration by your instructor on Ordering Parts and Materials. Take notes and make sure you know the proper procedures for:
   a) Ordering parts from out of town.
   b) Ordering parts by mail.
   c) Ordering parts by telephone.
   d) Ordering used parts.
4. Go to a vehicle assigned to you by your instructor. List all of the parts and materials needed for repair. Give the parts number, price, and any other information which is needed. Describe orally or in writing the procedures you would use if you a) ordered the parts by telephone, or b) ordered the parts by mail. When you have completed this activity satisfactorily, ask your instructor for the Criterion Evaluation.

Criterion Evaluation:

Your instructor will assign you an automobile in your shop. List the parts and materials needed for repair, the parts number, the price. Describe orally or in writing the procedures you would follow when ordering the parts and materials by telephone or mail. You may use a collision guide for reference and you must receive a satisfactory rating on the checklist below.

STUDENT CHECKLIST

	SATISFACTORY	UNSATISFACTORY
1. All parts and materials identified.	______	______
2. Parts numbers identified correctly.	______	______
3. Cost of parts and materials identified correctly.	______	______
4. Procedures for ordering described correctly.	______	______

AUTO BODY REPAIR

	1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
Module 01 Occupational Knowledge				
Competency Statements				
01 Describe working conditions common to auto body repairers				
02 Describe educational and/or technical requirements for auto body repairers				
03 Describe the job market over the next 5-10 years for auto body repairers				
04 Describe the average salary and benefits given to auto body repairers				
05 Describe or define basic tools and job tasks common to auto body repairers				
Module 02 Trim and Accessories				
Competency Statements				
01 Remove and replace bumpers				
02 Replace molding				
03 Remove and replace grille				
04 Replace locks and latches				
05 Repair manual seat tracks				
06 Remove, replace, and adjust power window control units				
07 Repair and/or replace window raising and lowering mechanisms				
08 Remove and replace seat and shoulder belts				
Module 03 Glass				
Competency Statements				
01 Remove and install windshield or rear window				
02 Install and align windows in doors				
03 Seal leaks around windshield and rear window				
Module 04 Painting and Refinishing				
Competency Statements				
01 Identify different types of abrasives and explain their functions				
02 Use and maintain a spray gun				
03 Clean and prepare surface for undercoats				
04 Mask sections and parts				
05 Prepare and apply undercoats				
06 Match and mix paint, using correct thinners according to shop conditions				

		1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
Module 04 Painting and Refinishing					
Competency Statements					
07	Paint and finish surface				
08	Heat dry painted surface				
09	Refinish automobile with acrylic enamel				
10	Refinish automobile with acrylic lacquer				
11	Apply pinstriping to automobile				
12	Replace woodgrain panels				
Module 05 Metal Work					
Competency Statements					
01	Identify the various types of construction used in automobile manufacturing				
02	Identify parts (body and frame) of an automobile				
03	Identify welding processes used in restoring a damaged automobile				
04	Set up oxyacetylene welding station				
05	Select tip pressure and flame for oxyacetylene welding				
06	Cut metal with a gas welder				
07	Perform gas butt welding				
08	Perform lap welding operations with a spot weld				
09	Weld automotive framing member with an arc welder				
10	Perform diagonal checking				
11	Identify sheet metal damage				
12	Use auto body hammers and dollies to "rough out" sheet metal				
13	Use body file and pick hammer to smooth damaged sheet metal				
14	Use slide hammer and body spoon to restore damaged sheet metal				
15	Shrink a stretched area on a panel				
16	Fill and smooth depressed areas with body solder				
17	Use light-duty hydraulic straightening equipment				
18	Use plastic filler to restore damaged area				
19	Use fiber glass to restore a damaged area				
20	Repair fiber glass bodies				

	1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
Module 06 Body Alignment				
Competency Statements				
01 Aligns moveable body components (doors, deck lid and hood)				
02 Remove and install fenders				
03 Align headlights				
04 Align front end				
05 Remove and install fiber glass panel				
Module 07 Frame Work				
Competency Statements				
01 Analyze extent of damage to frame				
02 Align frame using portable or stationary frame equipment				
03 Repair frame horn and crossmember				
04 Reinforce frame				
Module 08 Estimating				
Competency Statements				
01 Explain why collision estimates may vary				
02 Identify extent of damages on automobile needing repair				
03 Use collision guide to compute costs of parts and labor for a damaged automobile				
04 Complete estimate form for a damaged automobile				
05 Verify insurance coverage				
06 Order parts and materials				

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